British airways
OVERSEAS DIVISION

Concorde

FLYING MANUAL

Volume I

Copy No.................

STATEMENT OF INITIAL CERTIFICATION.

This Manual is approved by British Airways Overseas Division in accordance with T.S.S Standard No. 02.

This Publication forms part of the British Airways Overseas Division Approved Operations Manual.

Prepared by Technical Information Services.

REVISION RECORD

Rev No	Date Entered	Initials	Rev No	Date Entered	Initials	Rev No	Date Entered	Initials

FLYING STAFF COMMENT SHEET

Flying Staff will please note on this sheet any comments as to the condition or deficiencies in this Manual

PLEASE DO NOT REMOVE THIS SHEET FROM THIS MANUAL YOUR COMMENTS ARE FOR THE INFORMATION OF THE DISTRIBUTION STAFF WHEN CHECKING THIS MANUAL.

BRITISH AIRWAYS OVERSEAS DIVISION

FROM: Technical Information Services
G.2.
Technical Block A.

TO: All Copy Holders

DATE: 12 August 1976

CONCORDE FLYING MANUAL VOLUME 1
FIRST ISSUE DATED 21 JULY 1976

TEMPORARY REVISION 13.01 Facing Page 02.
" " 13.02 Facing Page 05.

The above T/Rs were printed on blue paper in error.

Please replace these pages with the attached pages now printed on yellow paper.

TECHNICAL INFORMATION SERVICES.

CONCORDE FLYING MANUAL

Volume I

LETTER OF TRANSMITTAL - NO 13
AND
LIST OF EFFECTIVE PAGES

The contents of this permanent revision are approved by BA-OD in accordance with TSS Standard No. O-2.

This manual consists of the following pages, listed to show the latest issue date of each enabling a complete check of all pages to be made.

1. INSERT and/or REMOVE pages, as stated below.
2. REMOVE & DESTROY superseded pages.
3. Record this revision number on the Record Sheet.

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TEMPORARY REVISION NO. 12

The contents of this temporary revision index are approved by BA-OD in accordance with TSS Standard No. 0-2.

PROCEDURE:

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LETTER OF TRANSMITTAL

SUPPLEMENTARY REVISION NO. 3

The contents of this supplementary revision index are approved by BA-OD in accordance with TSS Standard No. 0-2.

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FLIGHT COMPARTMENT AND PANELS

INTRODUCTION

The flight deck compartment is designed to accomodate three operating crew members and a supernumerary crew member. In addition full provision is made for accommodating a second supernumerary crew member.

Oxygen and communication facilities are provided at each station.

INSTRUMENT AND CONTROL PANELS

The Captains' and First Officers' panels comprise a dash panel in front of each pilot displaying flight instruments and a centre dash panel containing engine instruments. Above the centre dash panel is a glareshield panel containing auto-pilot, flight director auto throttle mode selection as well as control for VOR/ILS frequency selection for each pilot.

The left and right side consoles provide controls for nosewheel steering, weather radar and panel lighting.

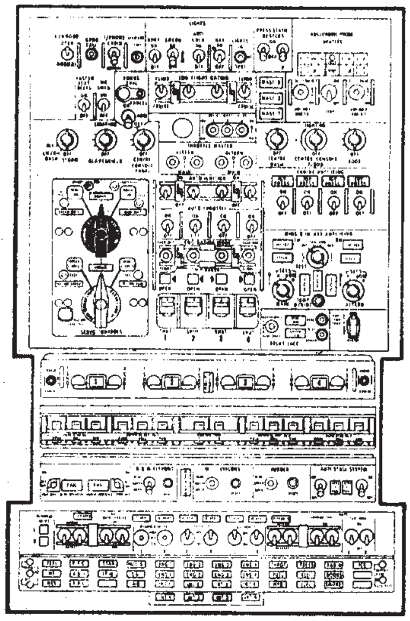
The centre console provides mounting for the throttles and reverse thrust controls together with visor and droop nose standby control, parking and emergency braking selectors, standby landing gear controls, communication and navigation control panels.

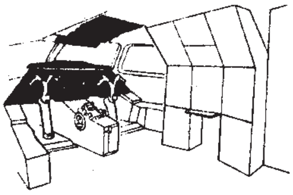
The roof panel, mounted centrally between the two pilots is presented as a series of stepped sub-panels normal to the line of sight and a flat panel to the rear of the sub-panels. The sub-panels contain master warning indications, switches for external lighting, controls and overheat warning lights for the de-icing and de-misting equipment, flying control inverter switches, autostabilizer, auto trim, artificial feel switches and engine shut down controls. The rear panel is accessible to all three operating crew members. It contains throttle system switches, HP valves, ignition controls, flying control hydraulic changeover, systems heater controls and anti-icing controls.

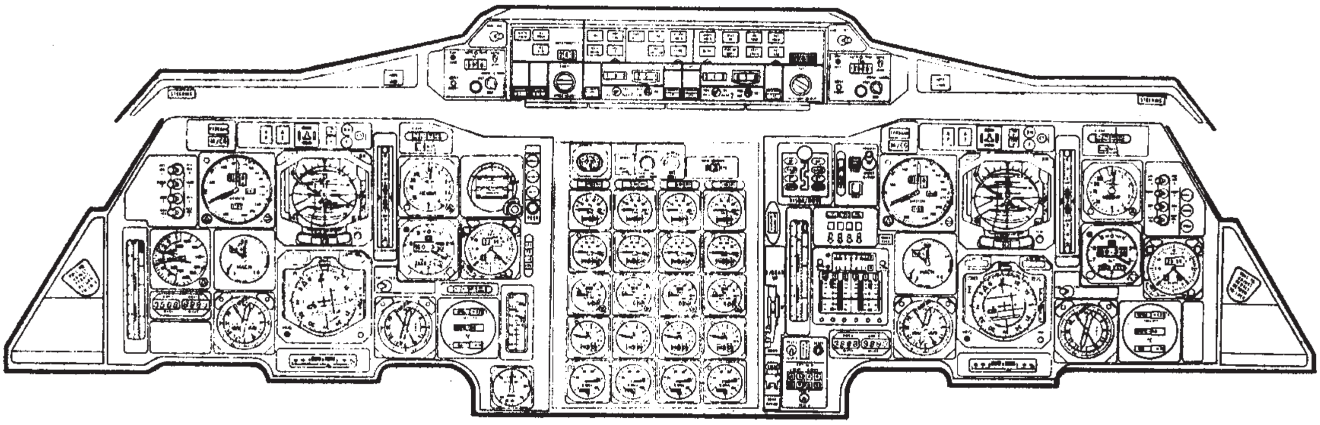
The systems management panels are located at the Flight Engineers' station immediately aft of the First Officer. It is arranged so that the more important switches and controls are accessible to the captain when his seat is in the rearmost position. The panel layout comprises sub-sections presenting information on the power plant, fuel, hydraulic, electrics, air conditioning and pressurization, oxygen, fire detection and anti-icing systems. Where appropriate, panels are engraved with a logic diagram of the system.

FLIGHT COMPARTMENT PANEL LOCATION

PILOT'S PANELS AND ROOF PANELS
(Sheet 1 of 2)







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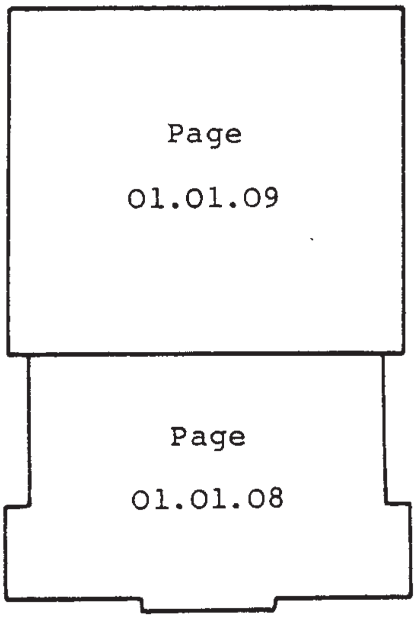
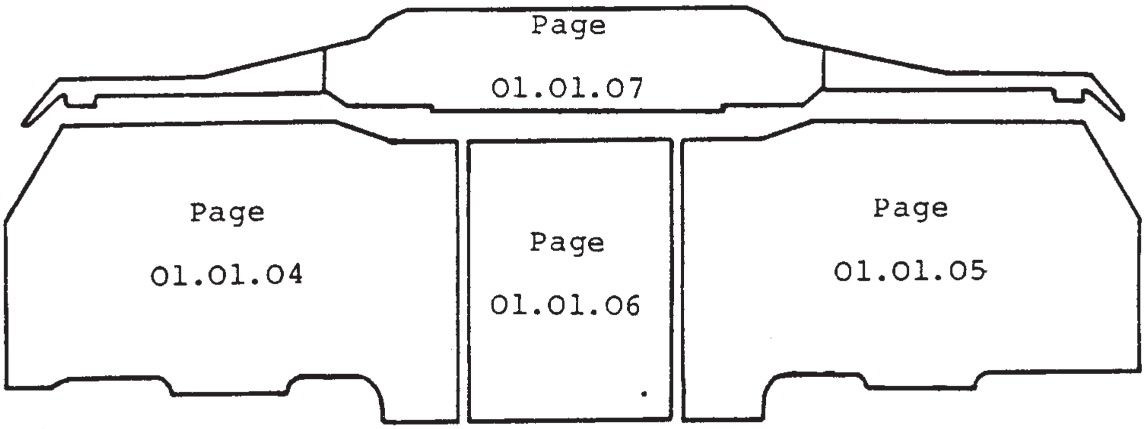
FLIGHT COMPARTMENT PANEL LOCATION

PILOT'S PANELS AND ROOF PANELS
(Sheet 2 of 2)





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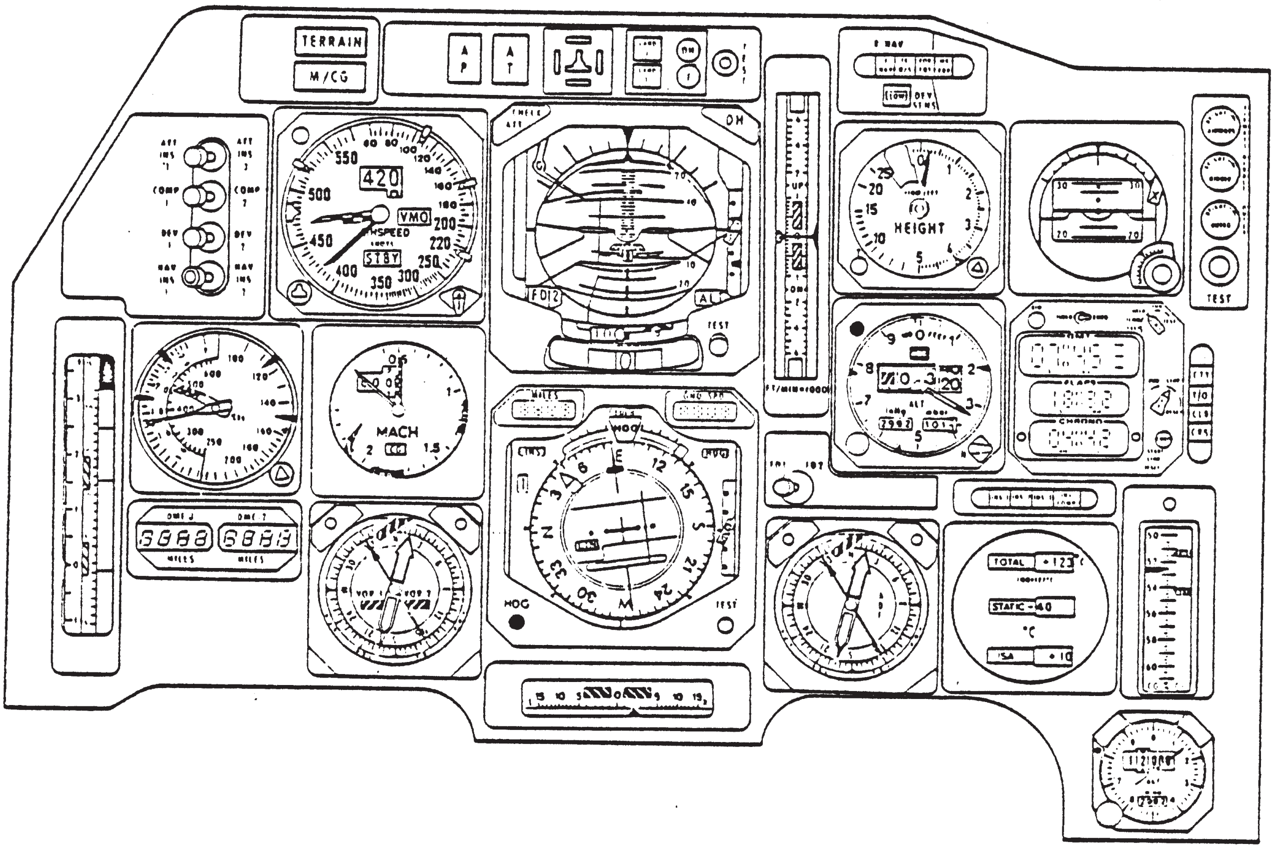
FLIGHT COMPARTMENT PANEL LOCATION

CAPTAIN'S DASH PANEL



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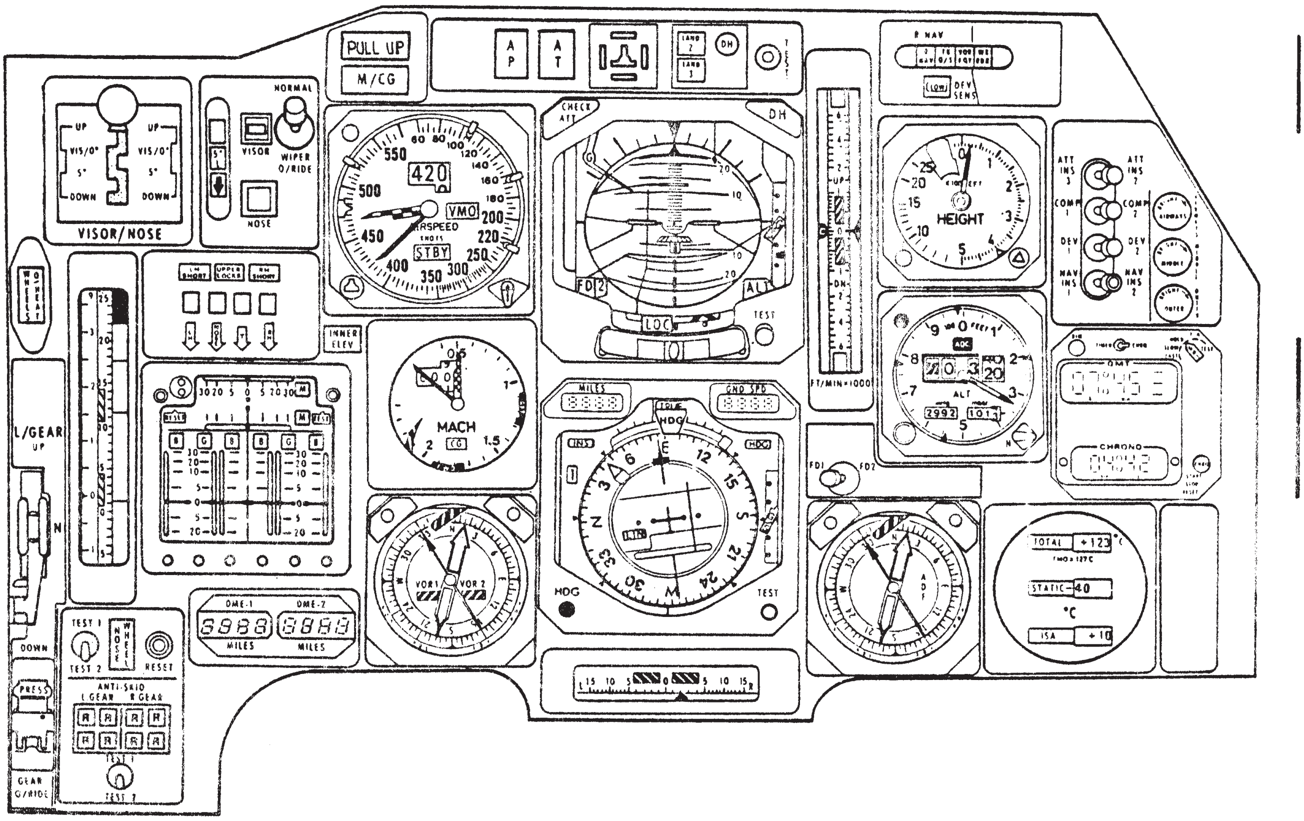
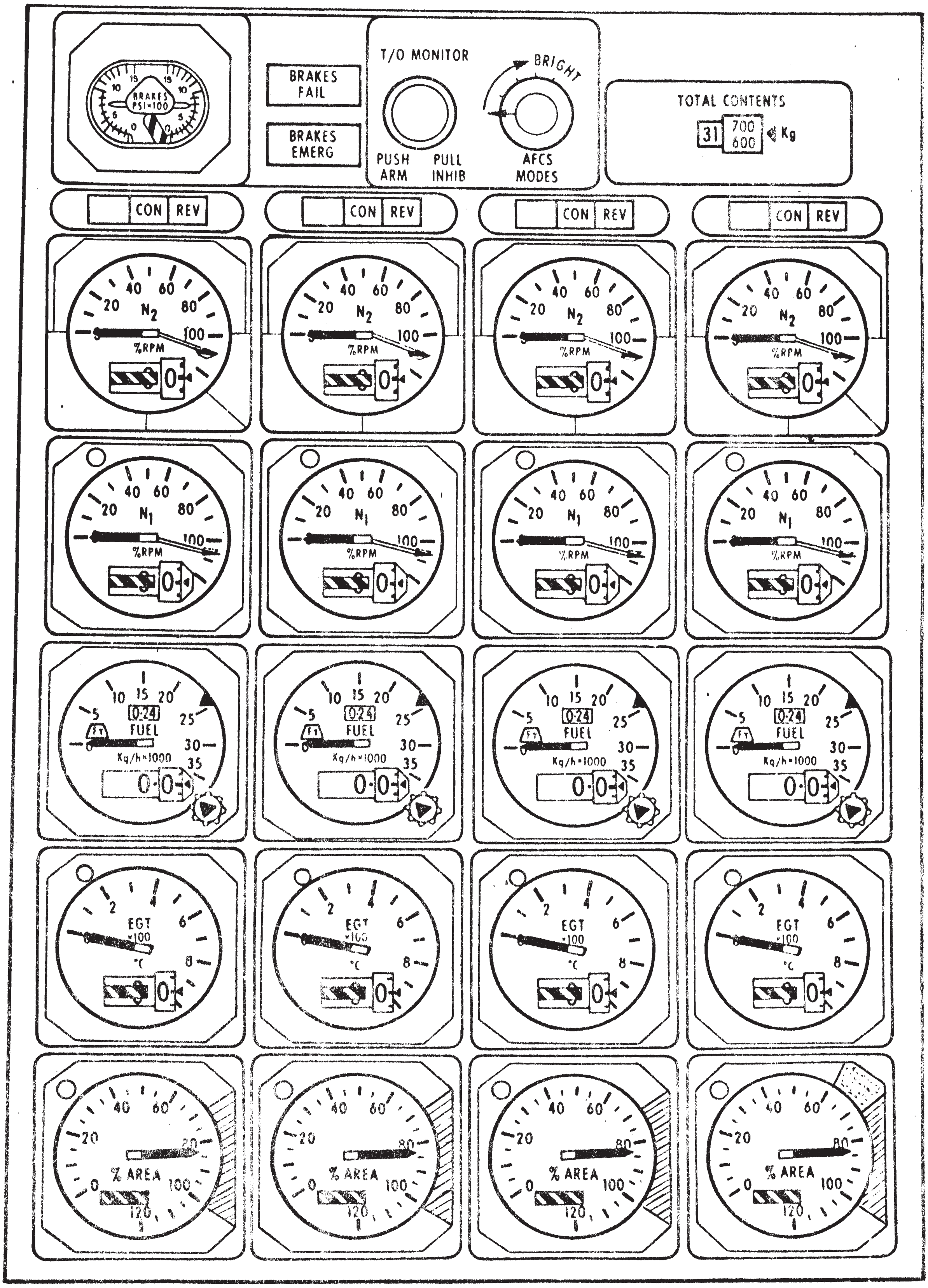
FLIGHT COMPARTMENT PANEL LOCATION

FIRST OFFICER'S DASH PANEL



FLIGHT COMPARTMENT PANEL LOCATION

CENTRE DASH PANEL



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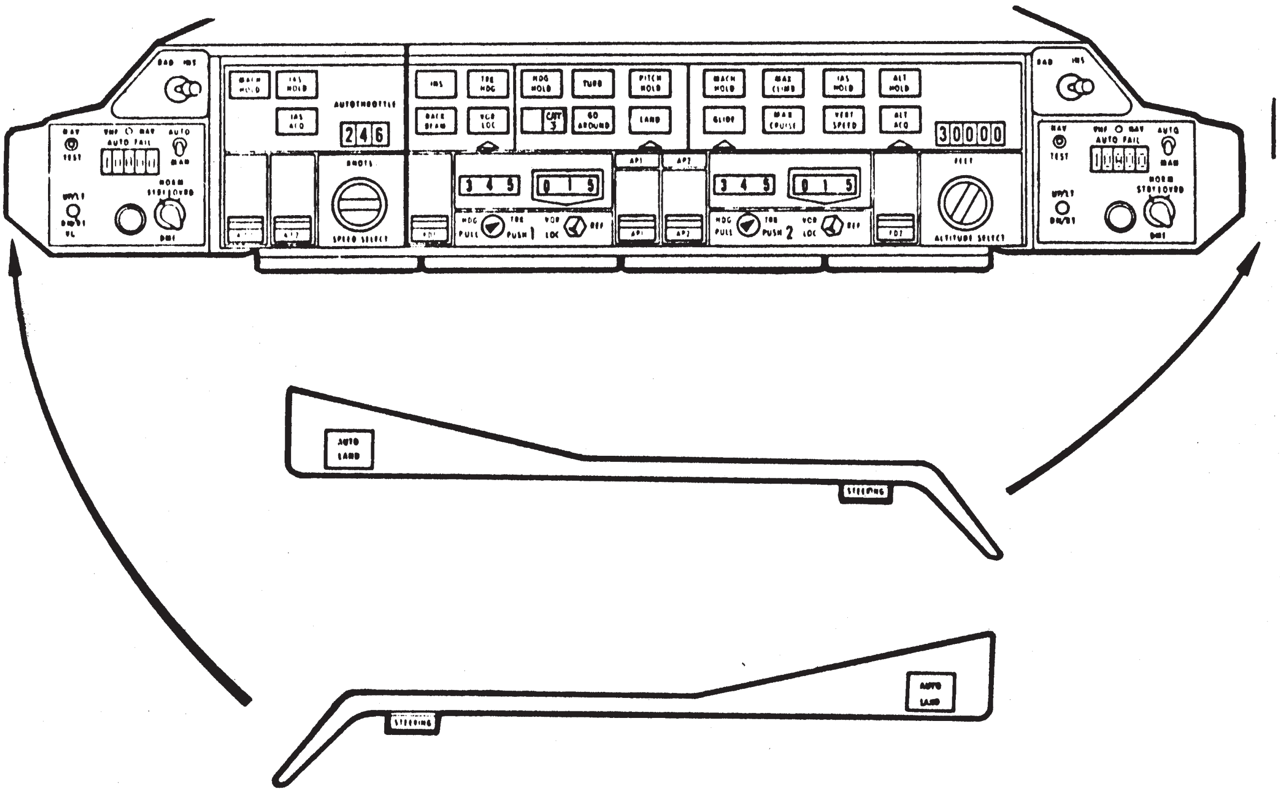
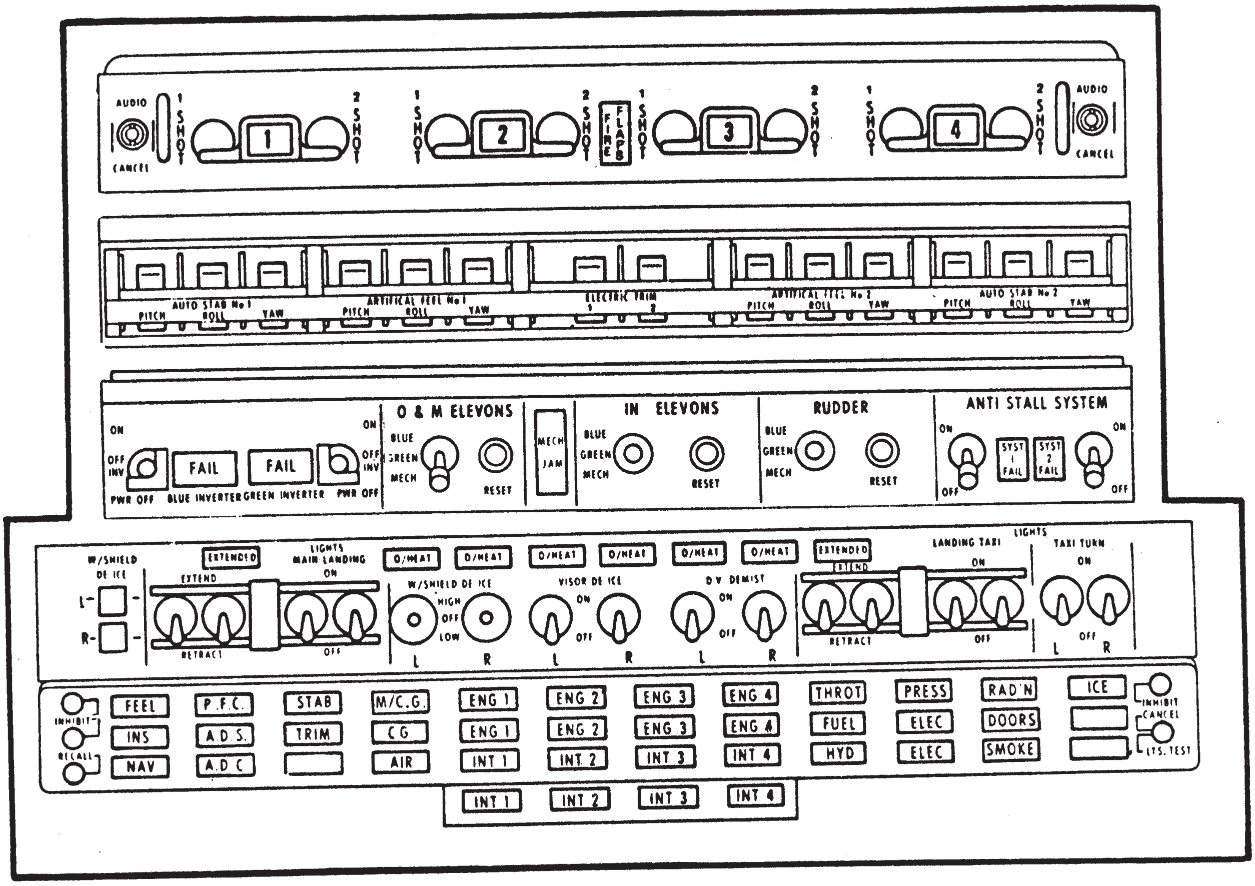
FLIGHT COMPARTMENT PANEL LOCATION

GLARESHIELD PANEL



FLIGHT COMPARTMENT PANEL LOCATION

ROOF PANEL (FORWARD)



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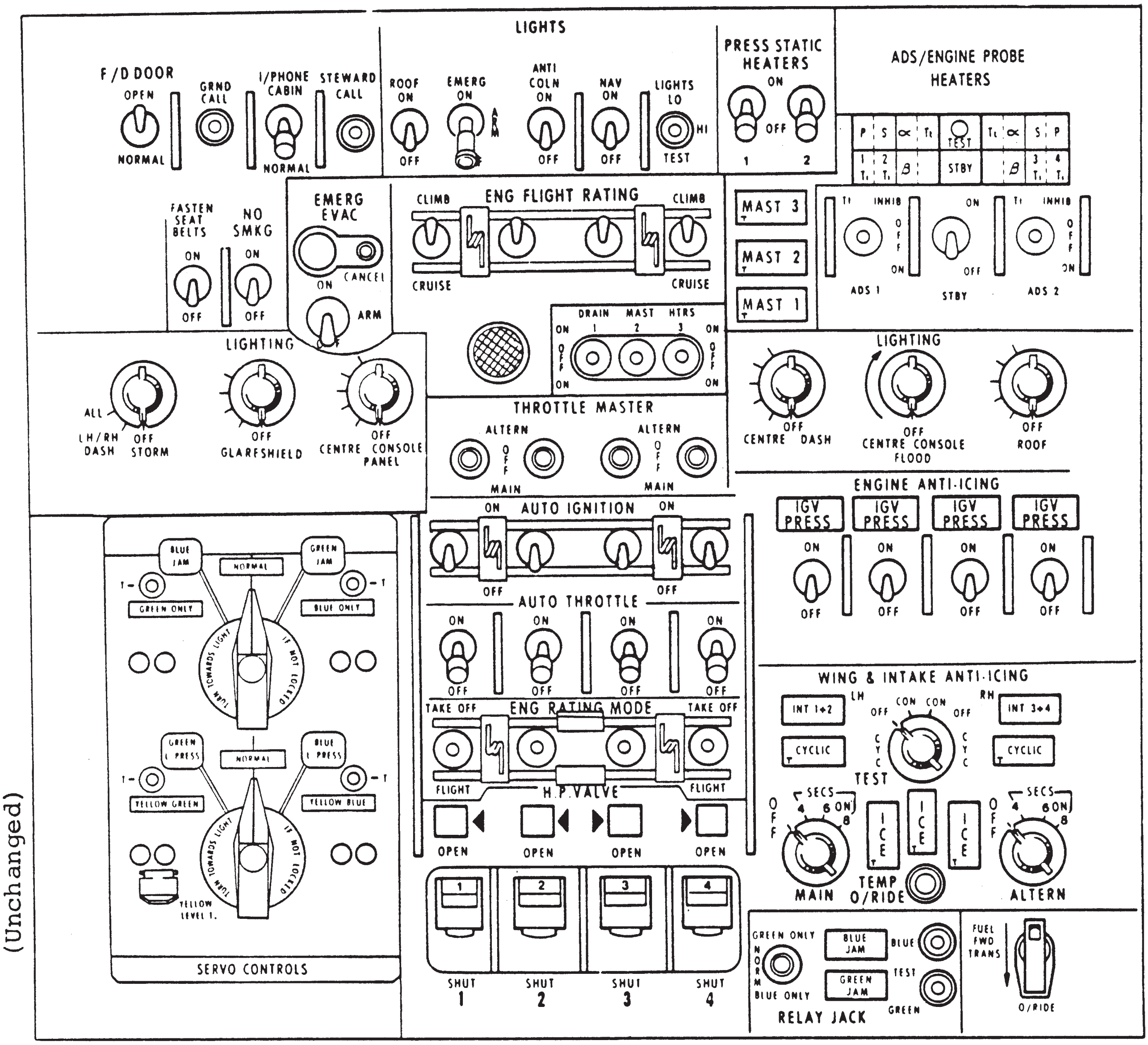
FLIGHT COMPARTMENT PANEL LOCATION

ROOF PANEL (AFT)



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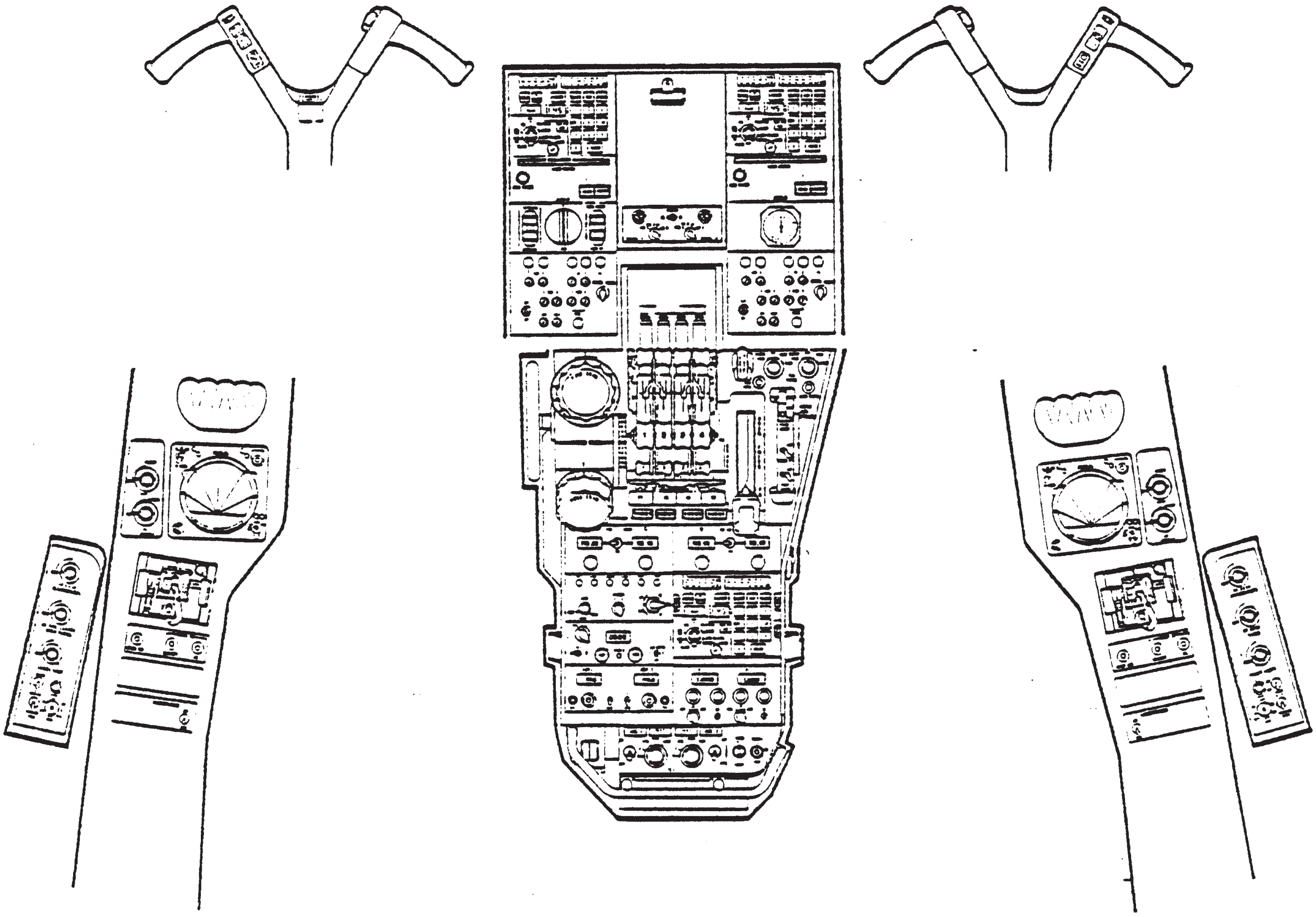
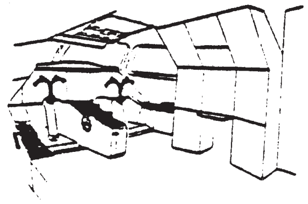
FLIGHT COMPARTMENT PANEL LOCATION

CENTRE, SIDE CONSOLES AND CONTROL COLUMNS
(Sheet 1 of 2)





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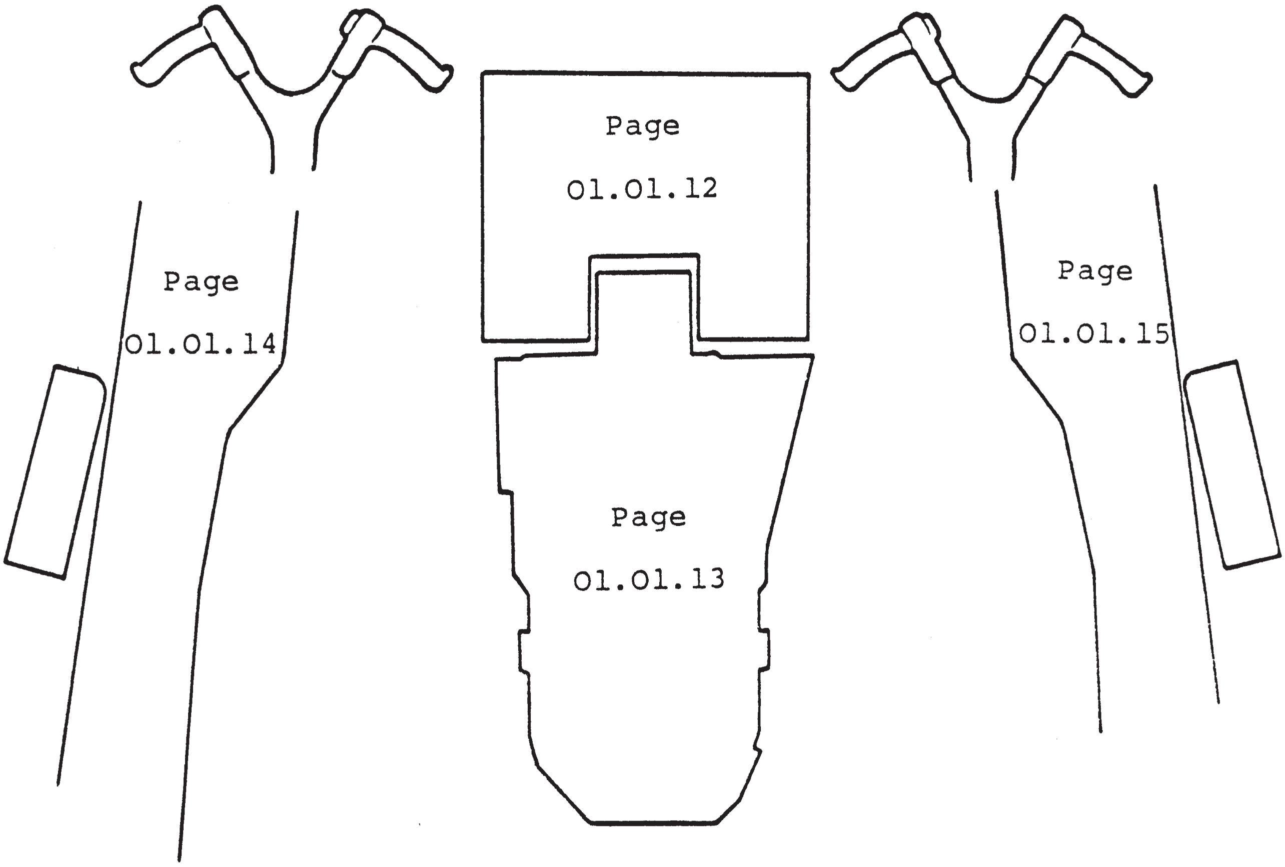
FLIGHT COMPARTMENT PANEL LOCATION

CENTRE, SIDE CONSOLES AND CONTROL COLUMNS
(Sheet 2 of 2)



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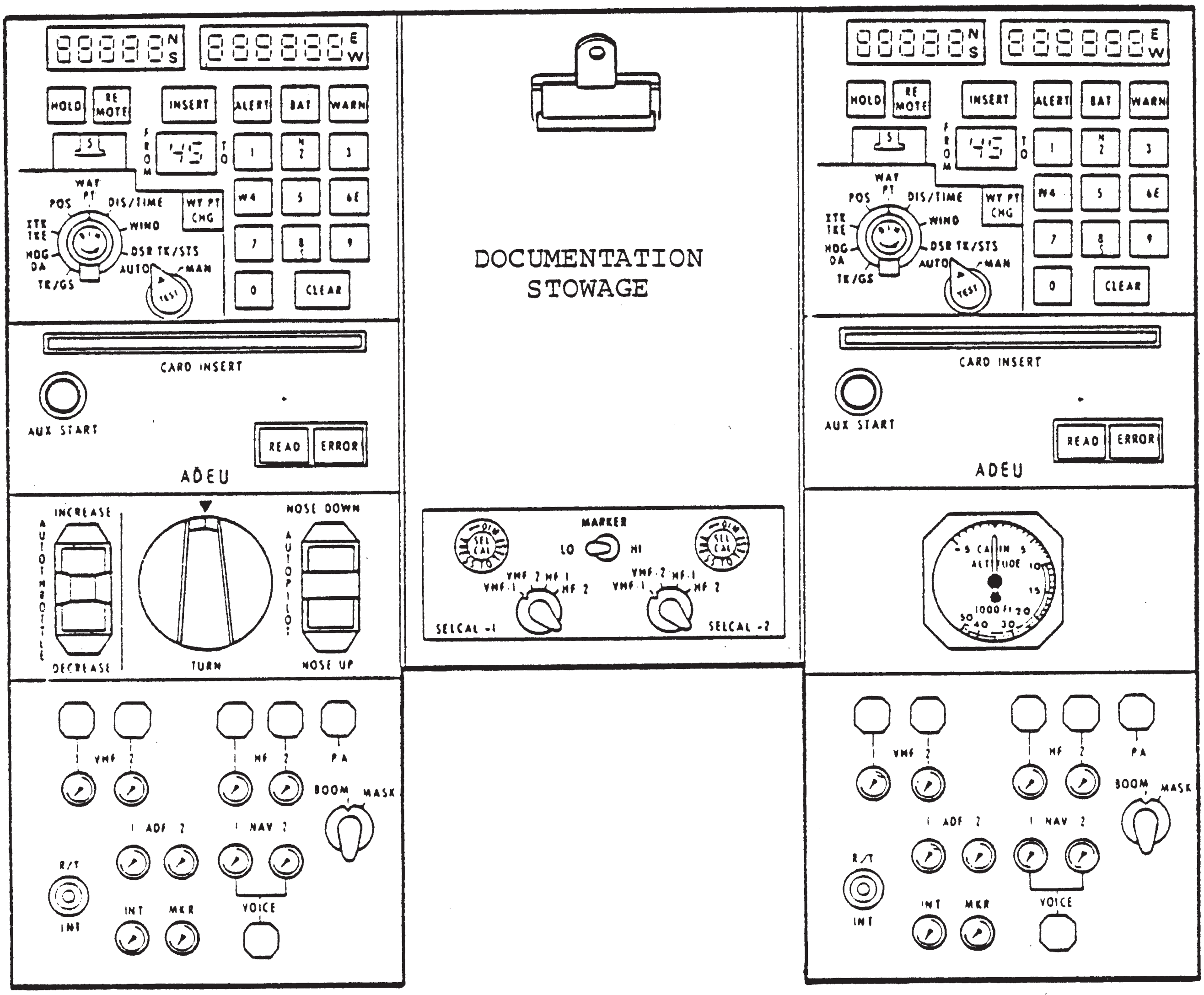
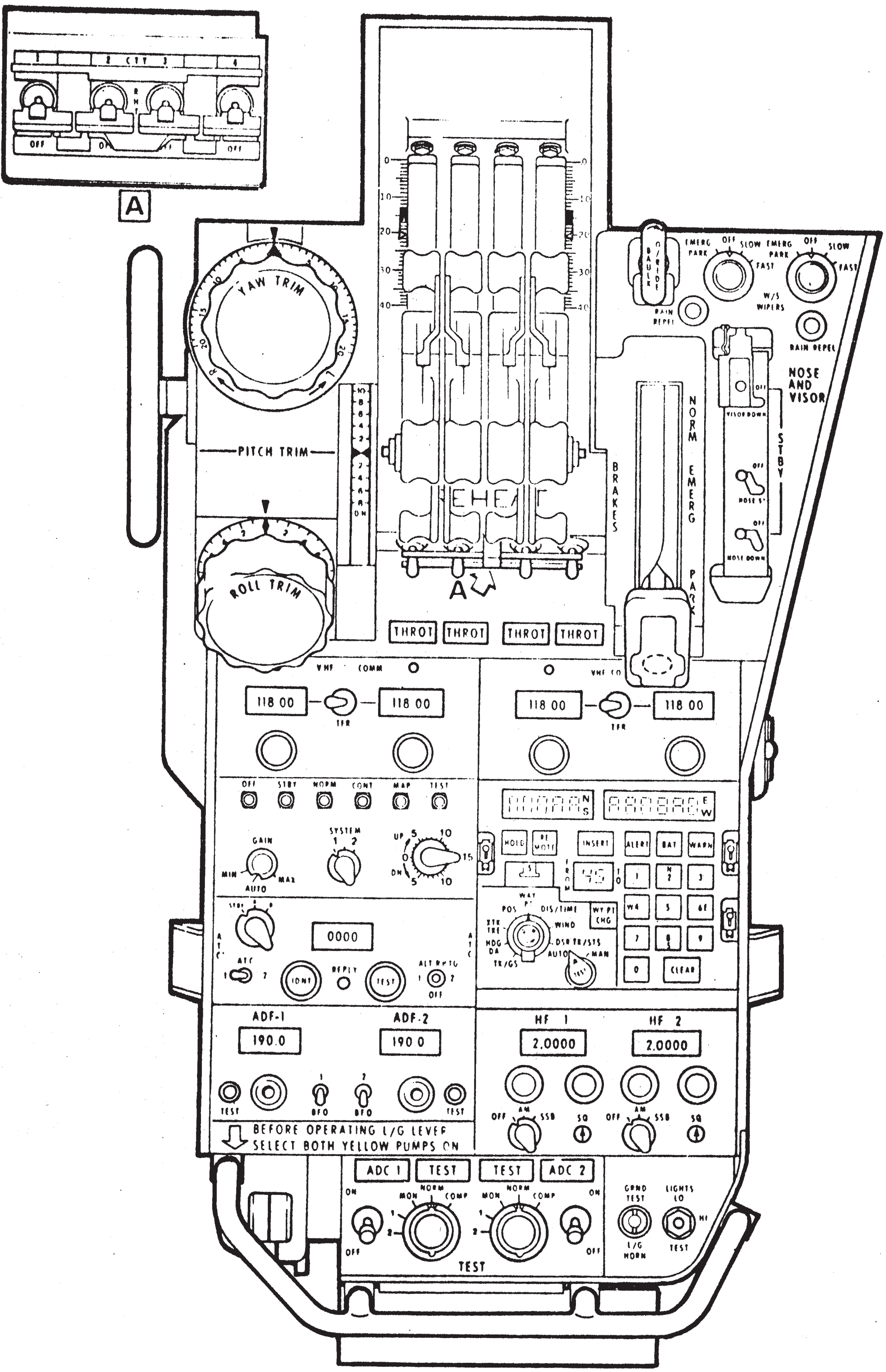
FLIGHT COMPARTMENT PANEL LOCATION

CENTRE CONSOLE (FORWARD)



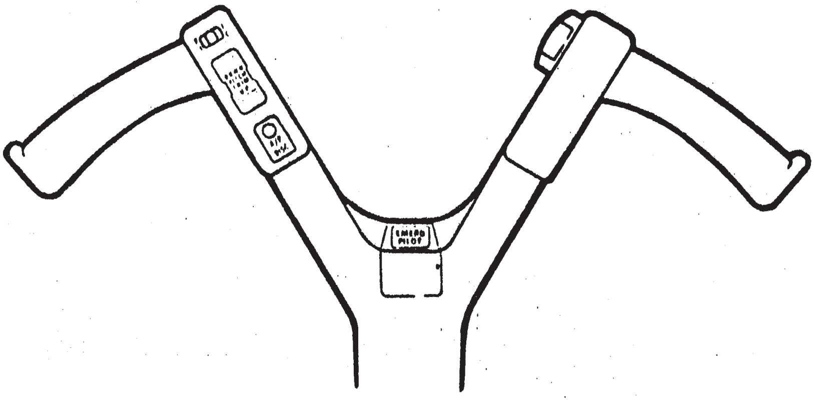
FLIGHT COMPARTMENT PANEL LOCATION

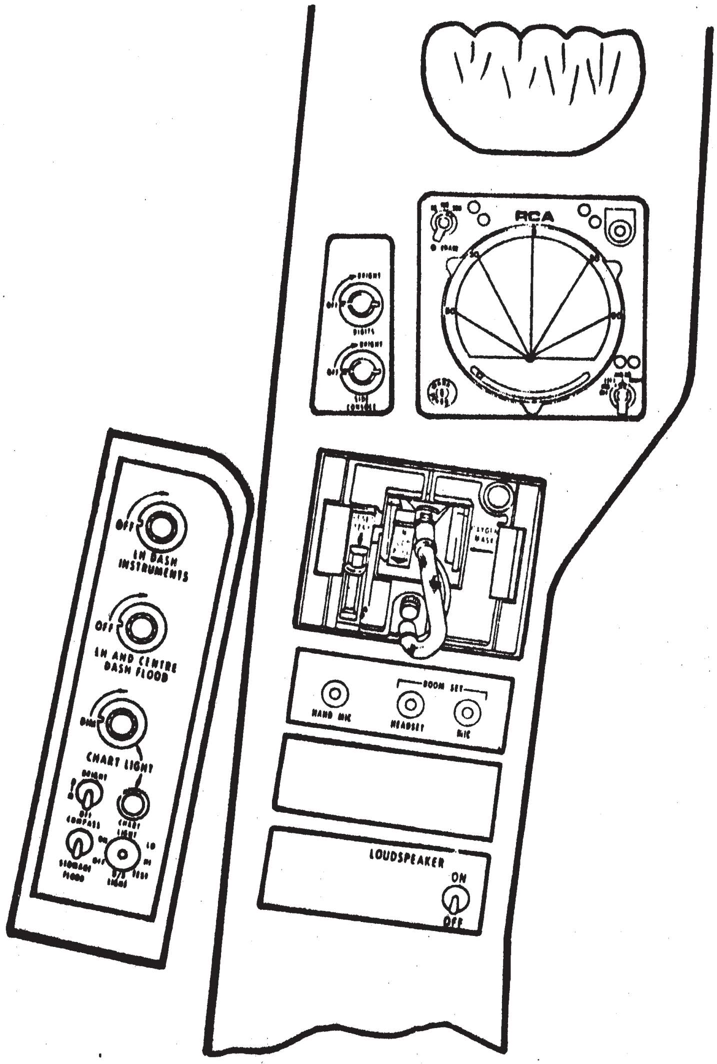
CENTRE CONSOLE (AFT)



FLIGHT COMPARTMENT PANEL LOCATION

CAPTAIN'S SIDE CONSOLE AND CONTROL COLUMN





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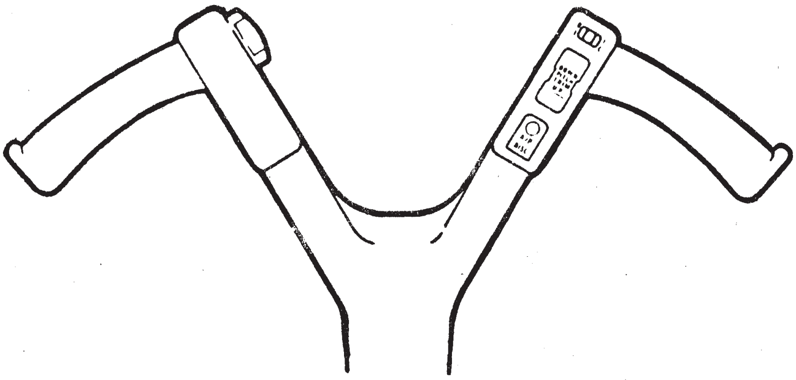
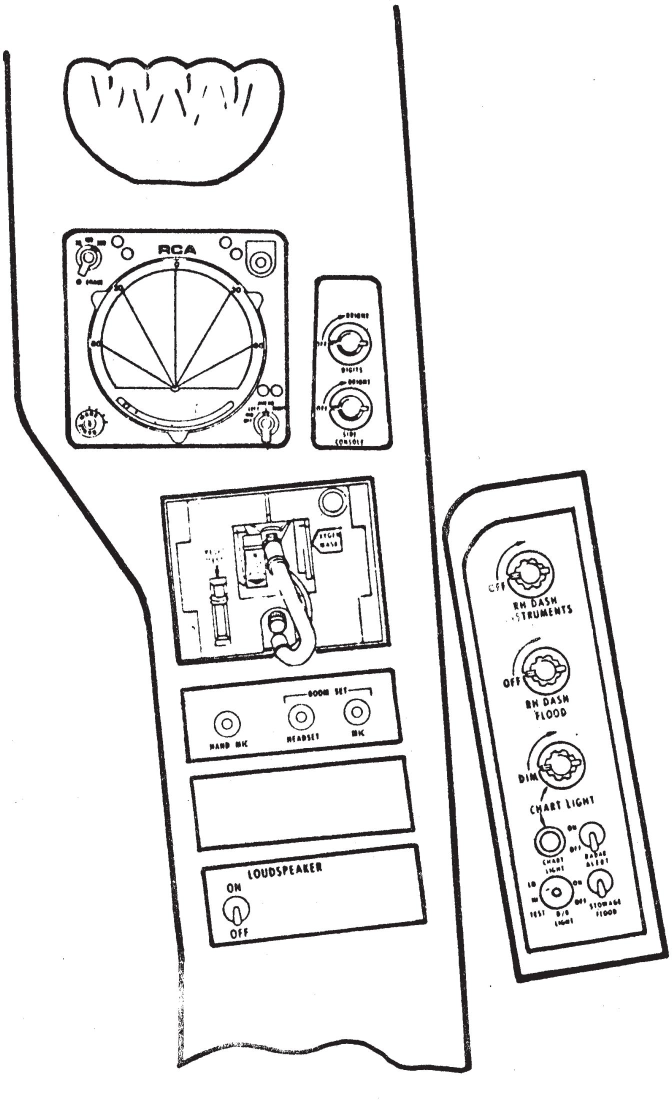
FLIGHT COMPARTMENT PANEL LOCATION

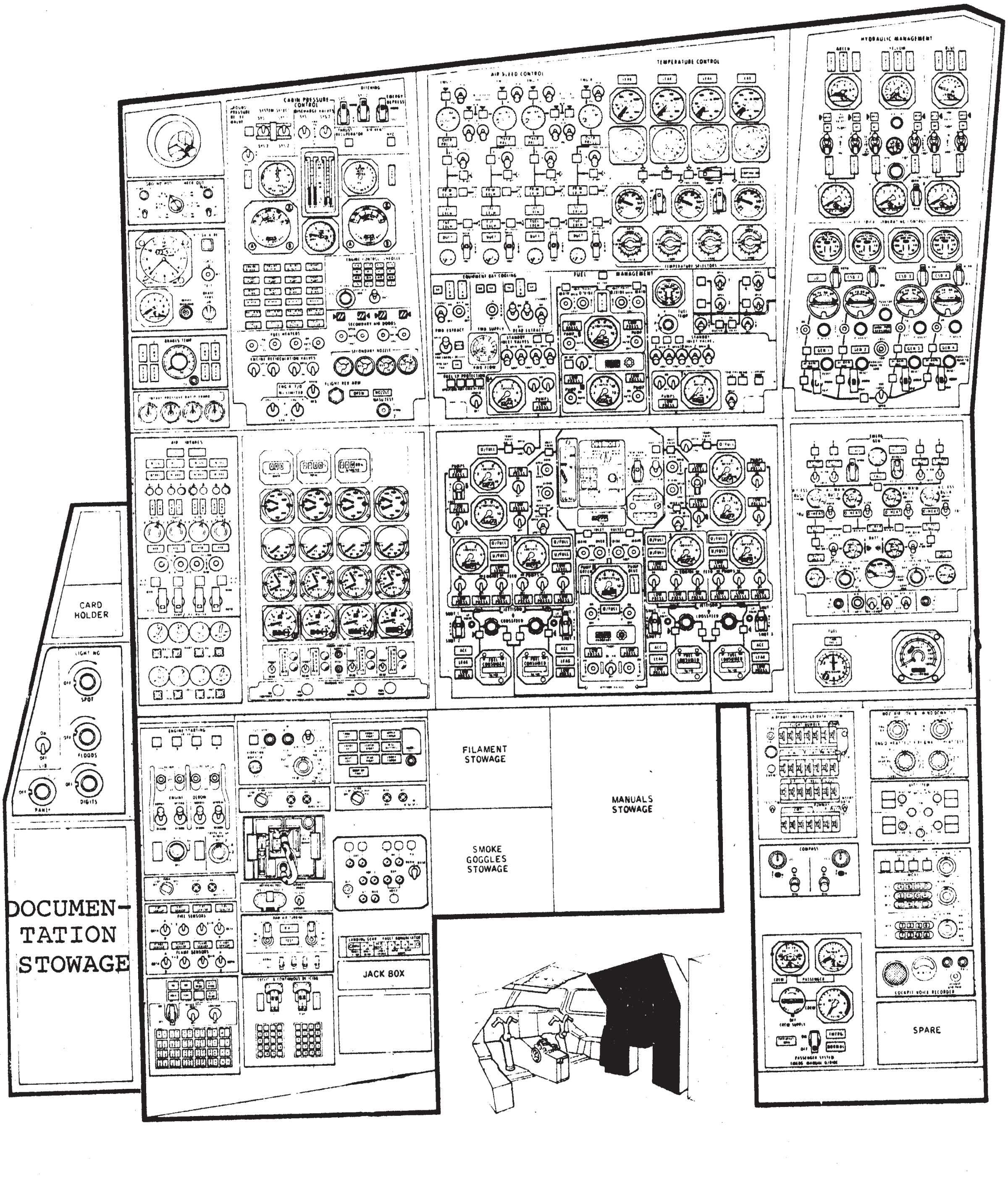
FIRST OFFICER'S SIDE CONSOLE AND CONTROL COLUMN





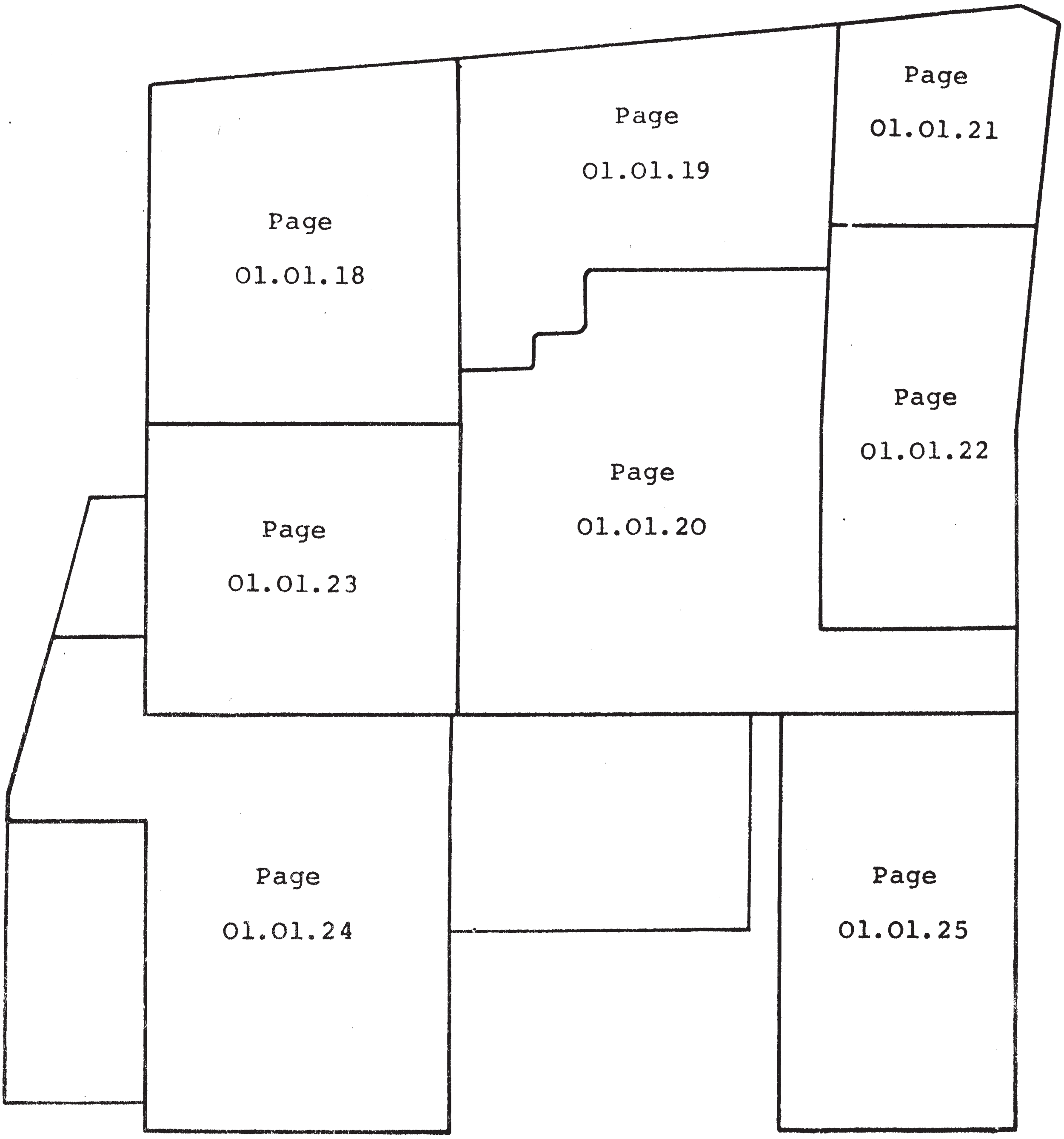
FLIGHT COMPARTMENT PANEL LOCATION

FLIGHT ENGINEER'S PANEL
(Sheet 1 of 2)



FLIGHT COMPARTMENT PANEL LOCATION

FLIGHT ENGINEER'S PANEL
(Sheet 2 of 2)



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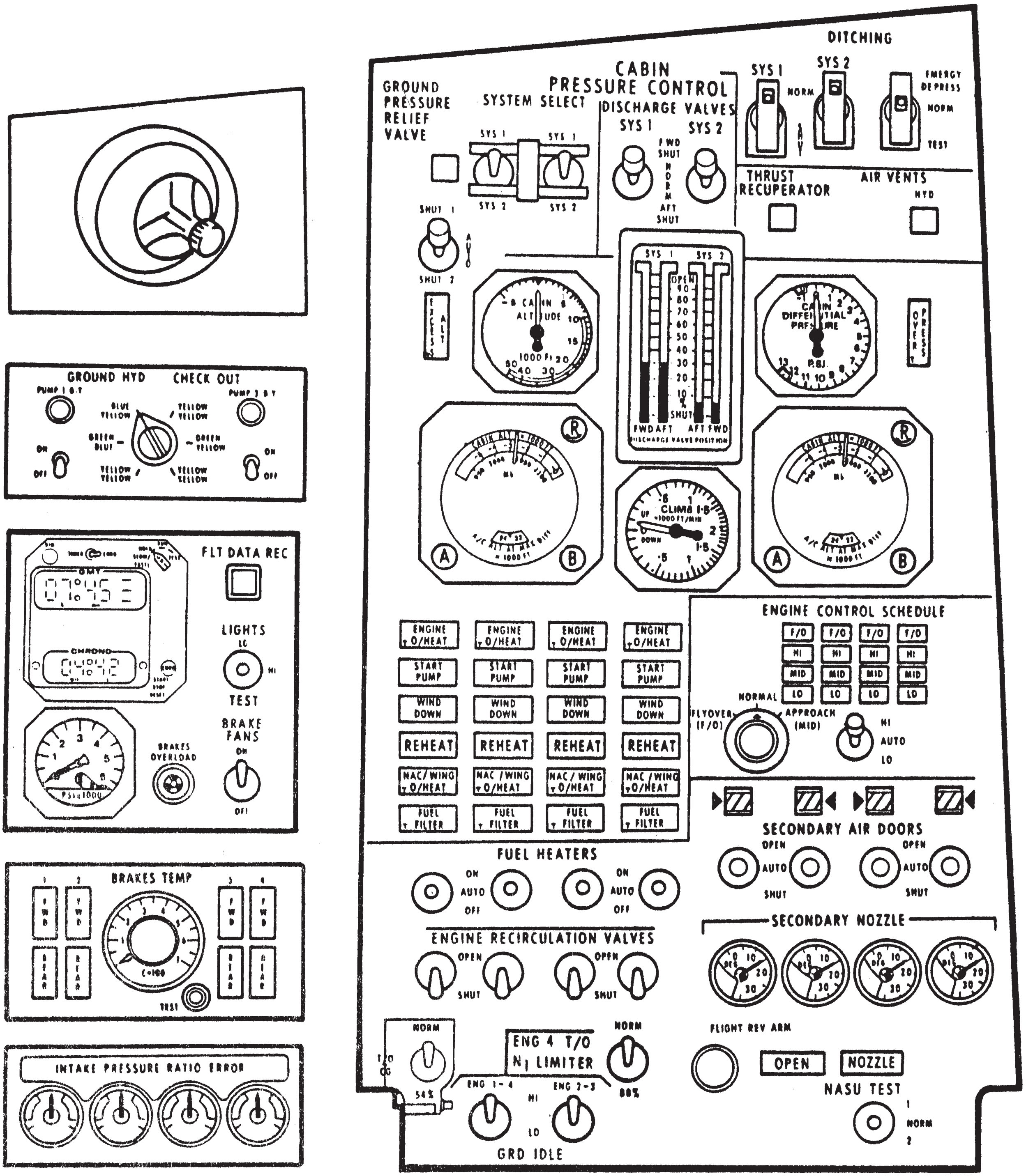
FLIGHT COMPARTMENT PANEL LOCATION

LEFT TOP PANEL



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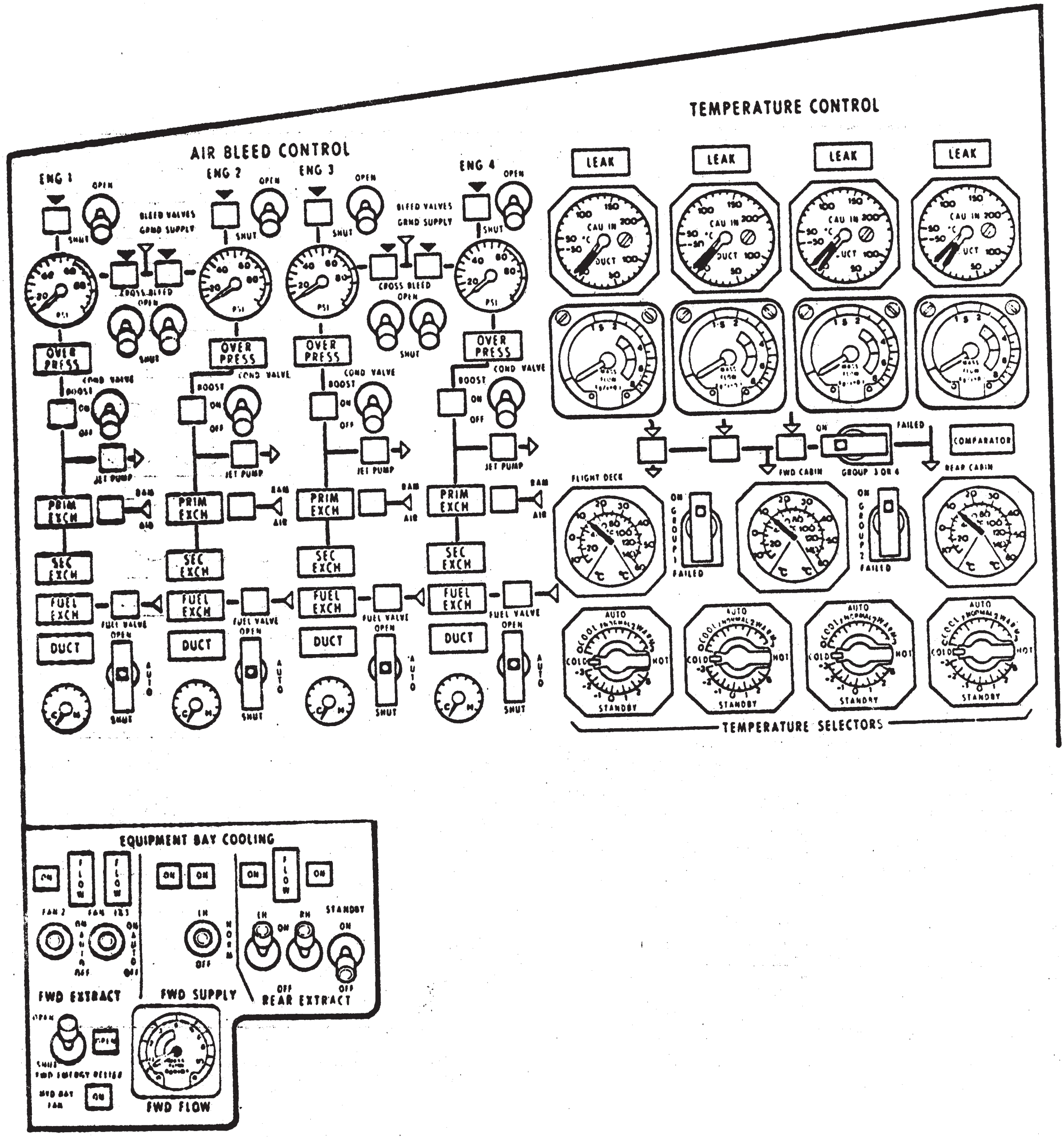
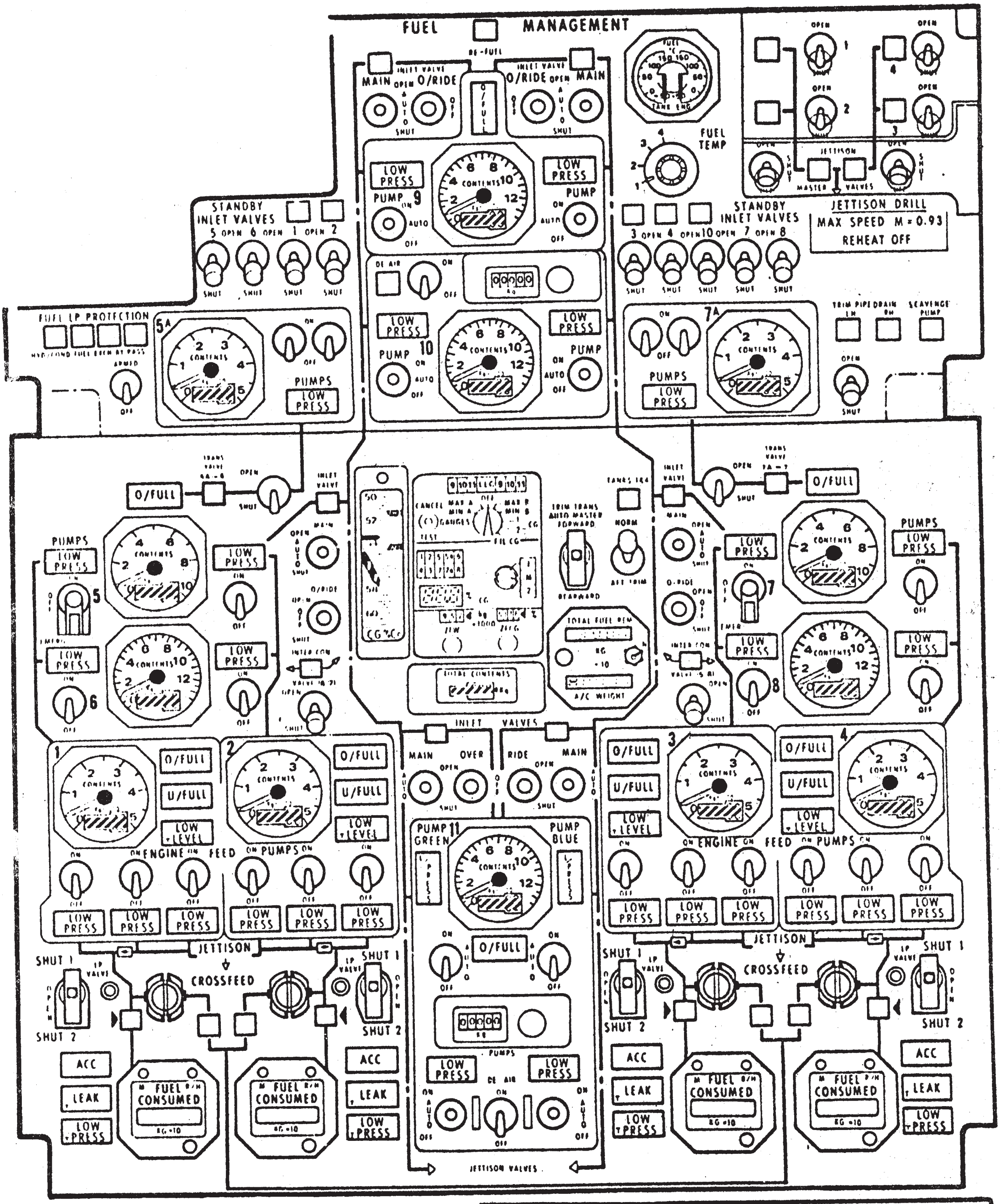
FLIGHT COMPARTMENT PANEL LOCATION

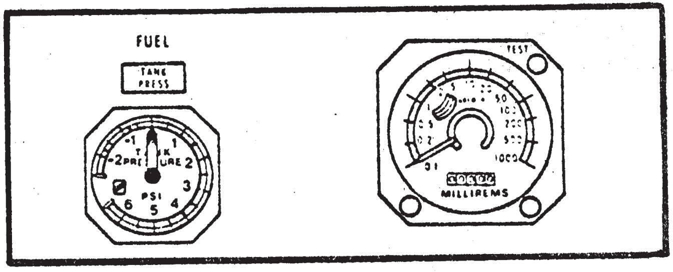
AIR BLEED, CABIN TEMPERATURE, EQUIPMENT COOLING PANELS



FLIGHT COMPARTMENT PANEL LOCATION

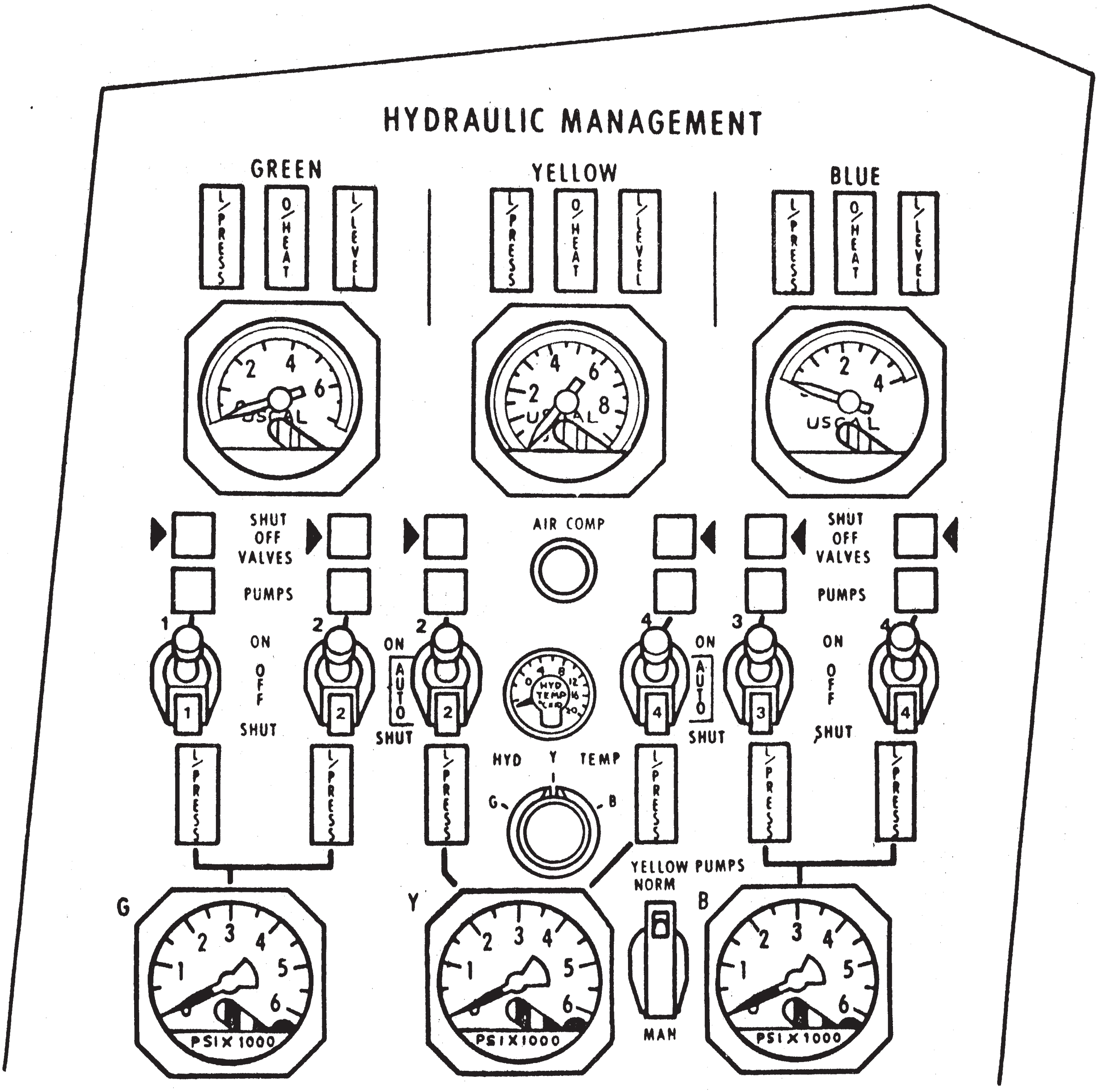
FUEL MANAGEMENT AND FUEL PRESSURIZATION PANELS





FLIGHT COMPARTMENT PANEL LOCATION

HYDRAULIC MANAGEMENT PANEL



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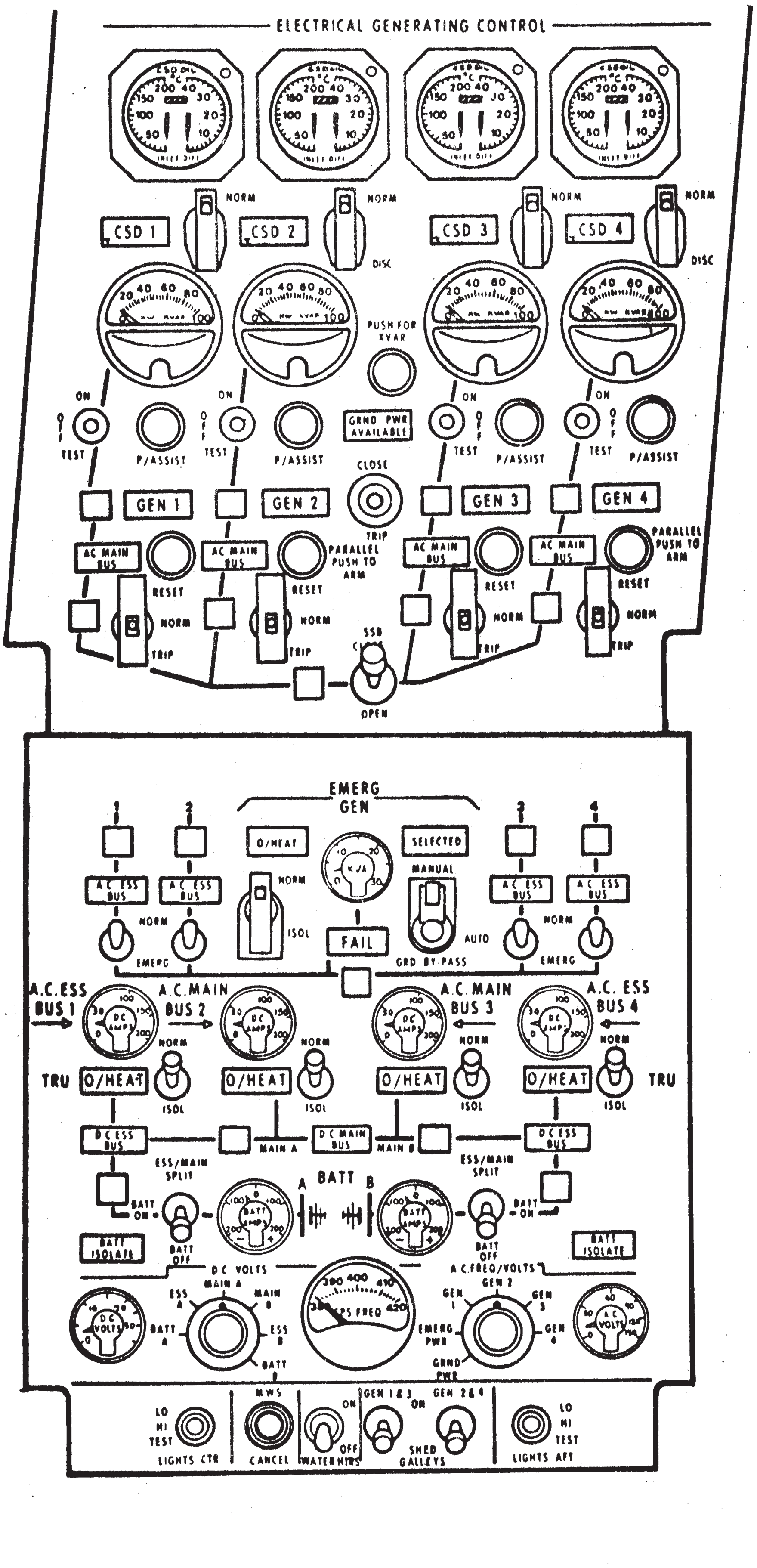
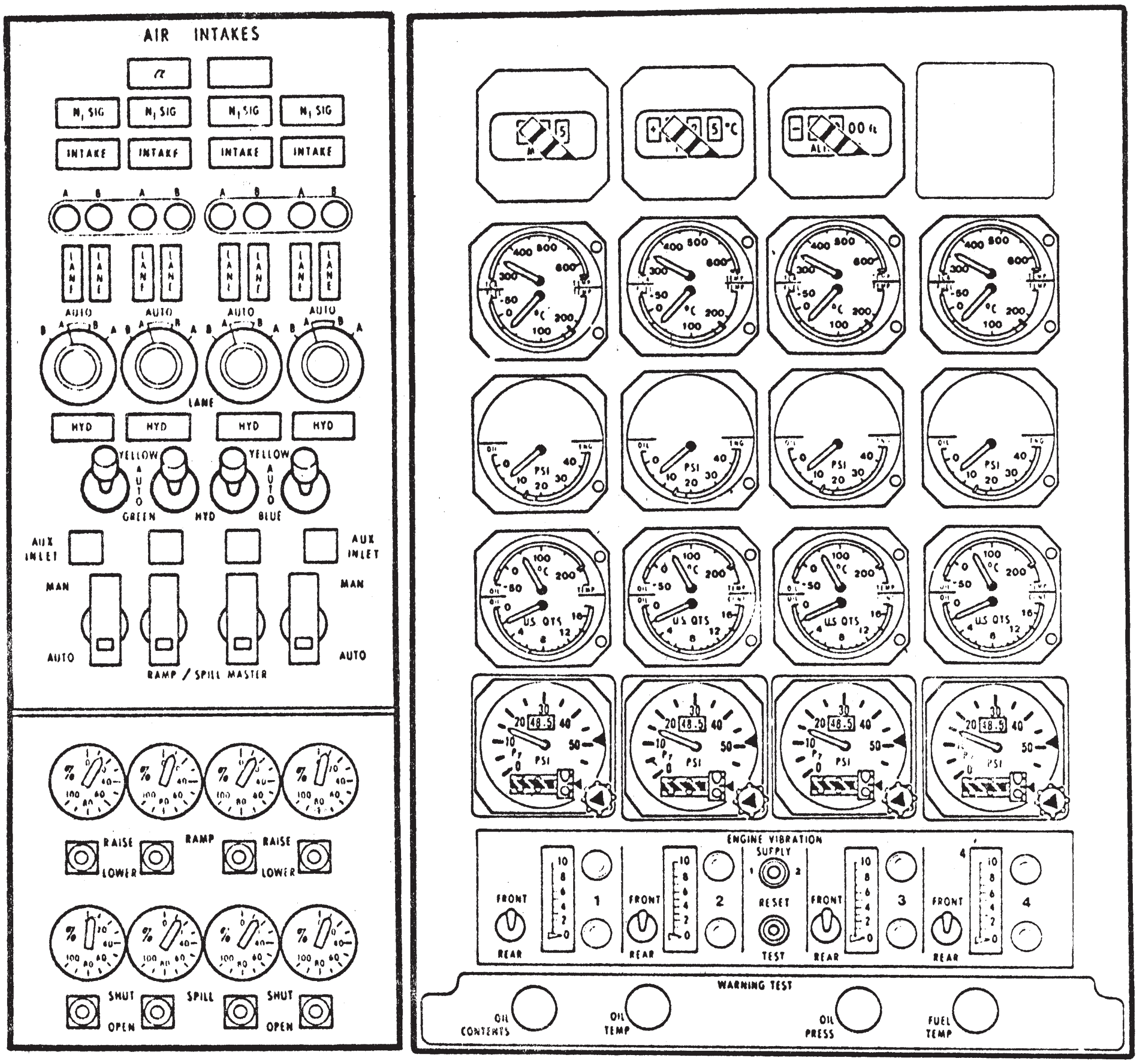
FLIGHT COMPARTMENT PANEL LOCATION

ELECTRICAL CONTROL PANEL



FLIGHT COMPARTMENT PANEL LOCATION

AIR INTAKES AND ENGINE SECONDARY INSTRUMENTS PANEL



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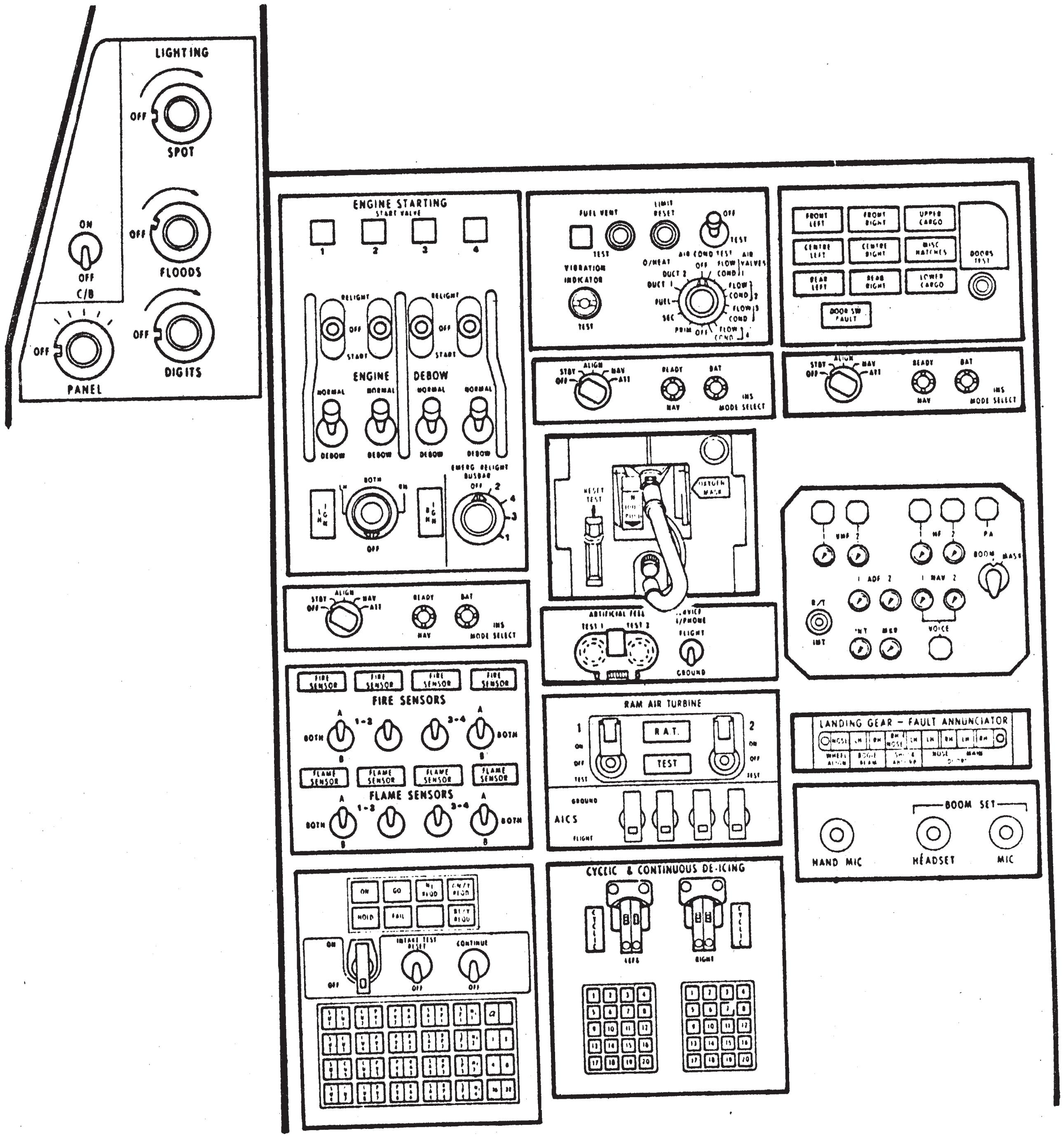
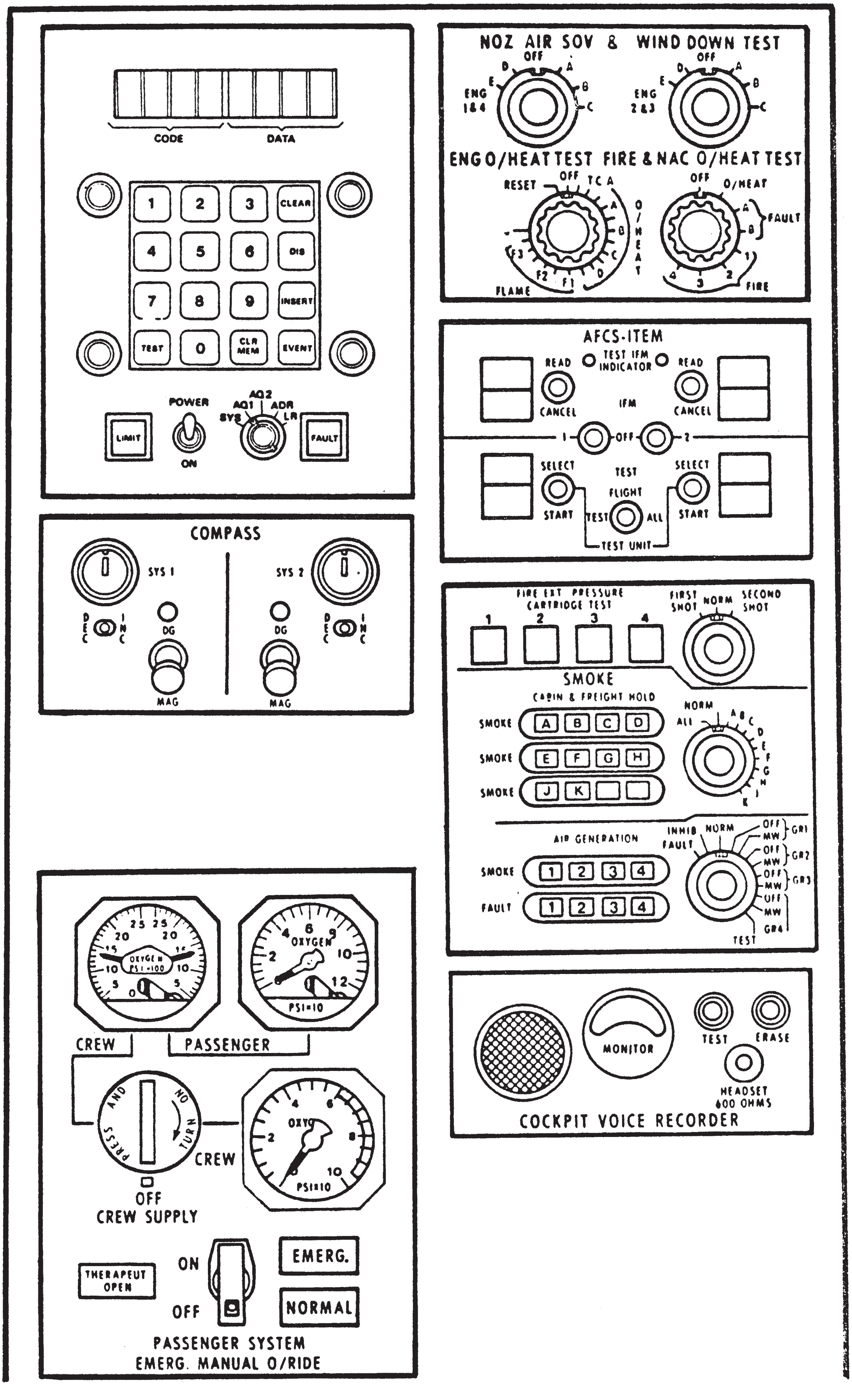
FLIGHT COMPARTMENT PANEL LOCATION

FORWARD LEG PANEL



FLIGHT COMPARTMENT PANEL LOCATION

AFT LEG PANEL



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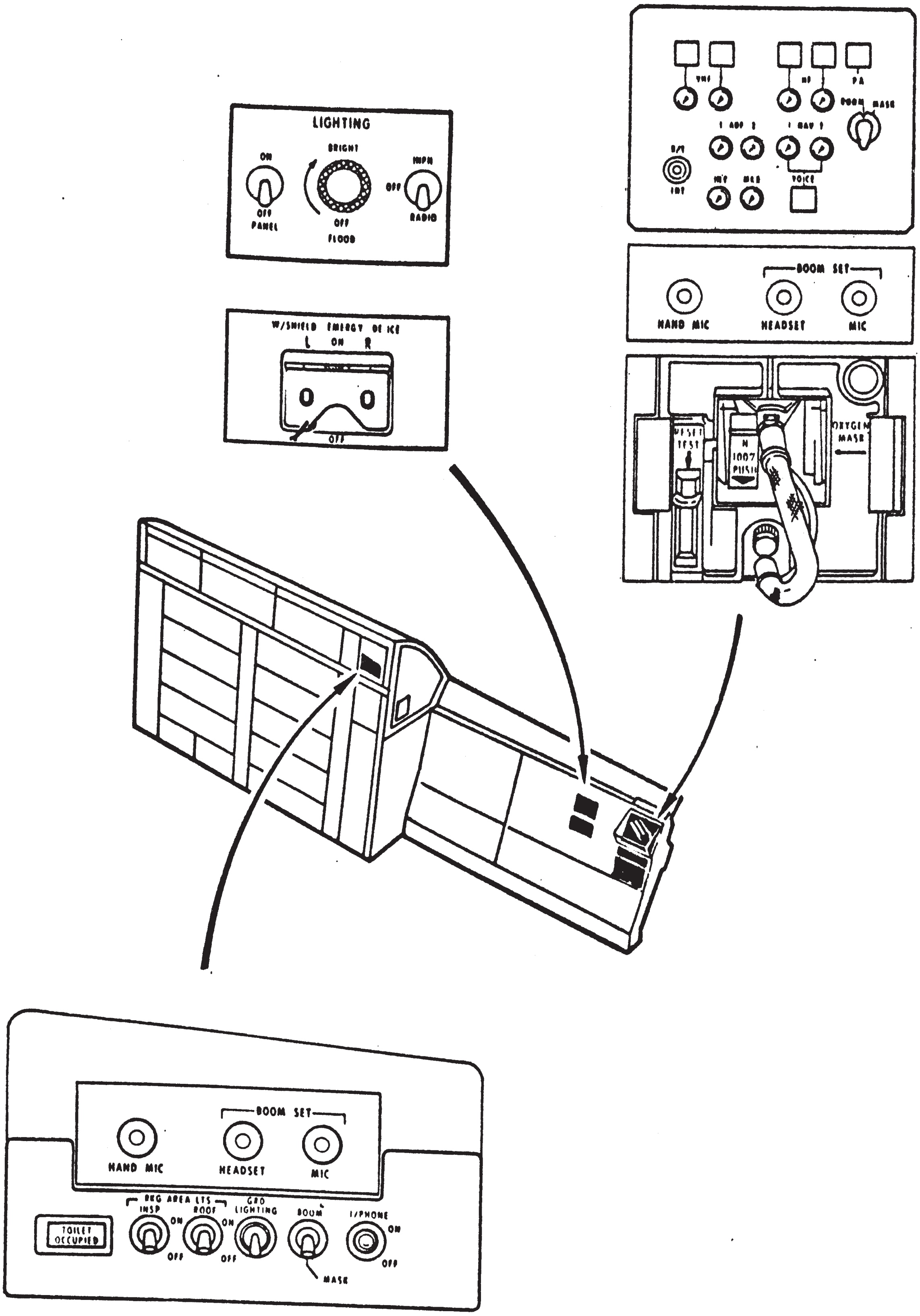
FLIGHT COMPARTMENT PANEL LOCATION

FIRST AND SECOND SUPERNUMERARYS' PANELS



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DESCRIPTION

FUSELAGE

The fuselage comprises five major sections: nose, forward, intermediate, centre and rear which are permanently joined to form a single unit. The basic structure consists of a skin supported by extruded stringers and fabricated hoop frames.

A single row of windows extends along each side of the pressurized cabin. Each cabin window comprises a pressure panel and an outer thermal insulation panel. Both panels consist of two layers of toughened glass separated by plastic interlayers.

The lower half of the fuselage is divided in various compartments to accommodate baggage, fuel, the nose and main landing gear and systems components etc. The upper half of the fuselage is occupied by the main cabin, the flight deck and a baggage hold incorporating a diplomatic mail locker.

The upper and lower halves are separated by a floor built as a number of sections and supported by a structure. The structure is free to expand longitudinally and thus minimise the thermal stresses arising from the temperature differentials between the fuselage skin and the longitudinal floor members.

The intermediate section of the fuselage houses the underfloor baggage compartment.

WING

The wing is a multi-spar structure skinned with integral panels manufactured from pre-stretched planks. Easily removable panels, together with the general use of latticed and lightened internal members, provide access to any structure or fuel tank area even in the thinnest section of the wing. There are three elevons at the trailing edge of each wing.

FIN AND RUDDER

The fin is a torsion box structure formed by a series of vertical spars and horizontal ribs which are covered with integrally machined skin panels. Attached to the torsion box are the dorsal fin and leading edge structure, the rudder jack attachments and their fairings, and the rudder hinges. The rudder is a single spar light-alloy structure, manufactured in two parts (top and bottom) coupled together.

NACELLES

Each engine nacelle accommodates two engines and is divided into two structurally independent parts: the air intakes and the engine bays. An extension of the engine bays incorporates the secondary nozzles. The intakes and engine bays are attached to the wing by flexible joints which ensure complete sealing and continuity of form.

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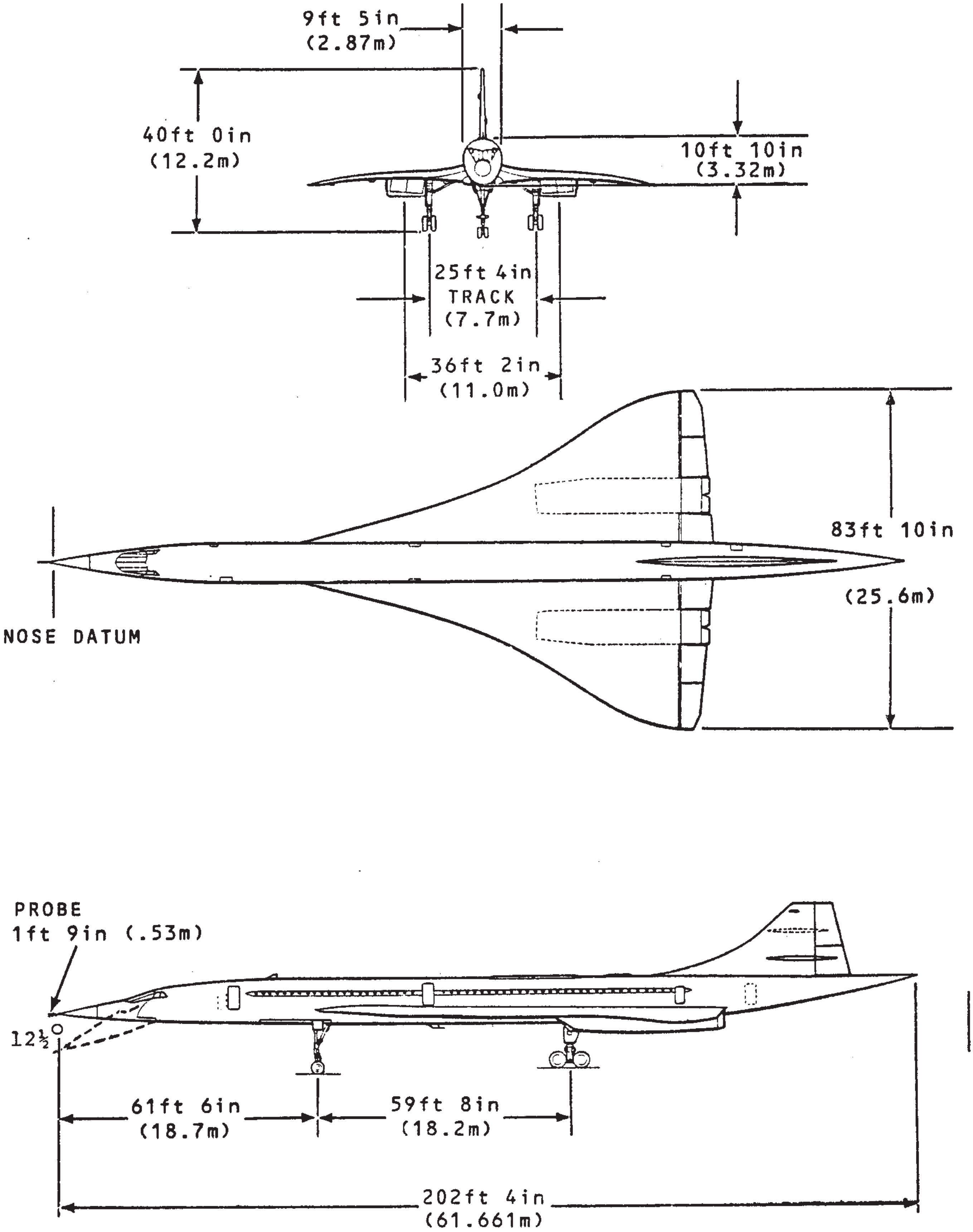
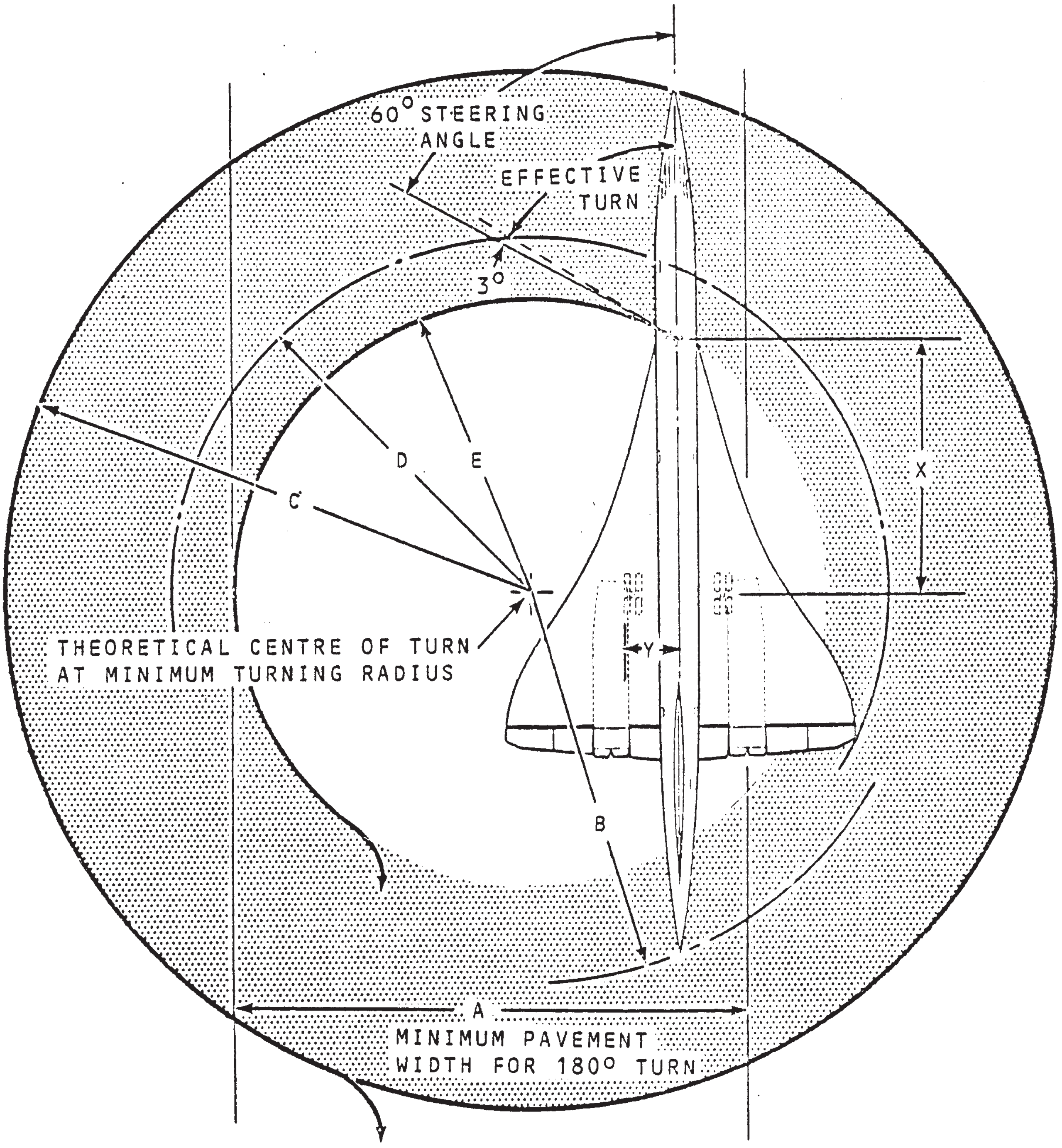
AIRCRAFT DIMENSIONS



MINIMUM TURNING RADII

NOTE: 60° IS MAXIMUM POWERED STEERING ANGLE
3° SLIPPAGE HAS BEEN ASSUMED TO OCCUR
GIVING AN EFFECTIVE ANGLE OF 57°


60° STEERING ANGLE
EFFECTIVE TURN
3°
D
E
C
X
Y
B
THEORETICAL CENTRE OF TURN AT MINIMUM TURNING RADIUS
A
MINIMUM PAVEMENT WIDTH FOR 180° TURN

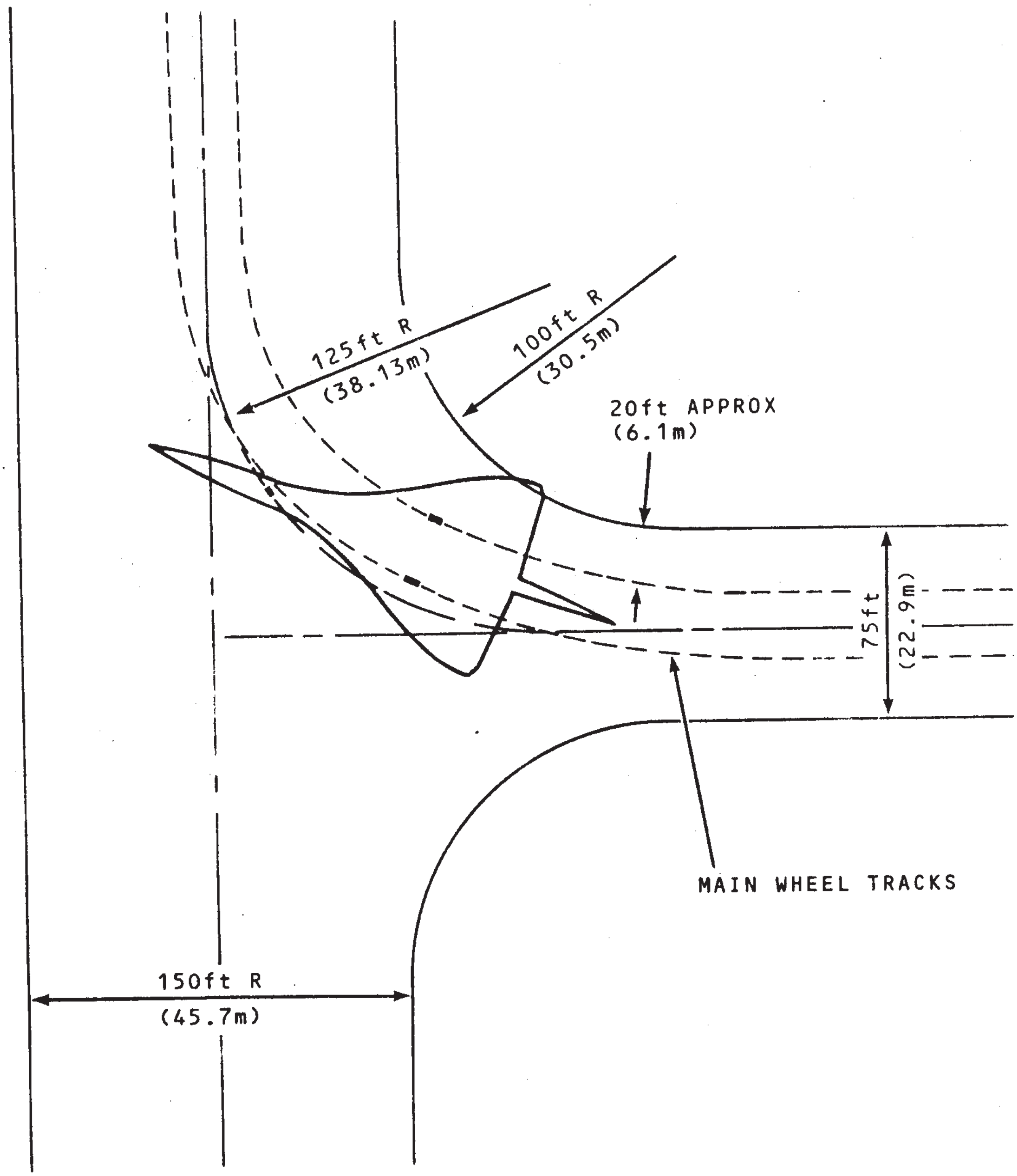
(Unchanged)

DIMENSIONS IN feet / metres

X	Y	A	B	C*	D	E
59.7	14.5	127	91	127	88	71
18.2	4.3	38.7	27.8	38.7	26.8	21.7

*NOSE FULLY RAISED Probe not included

90° TAXIWAY TO RUNWAY TURN



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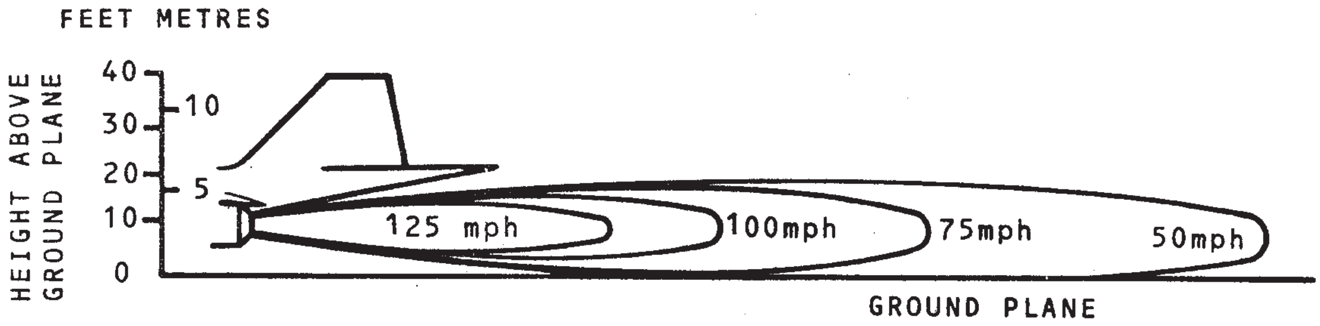
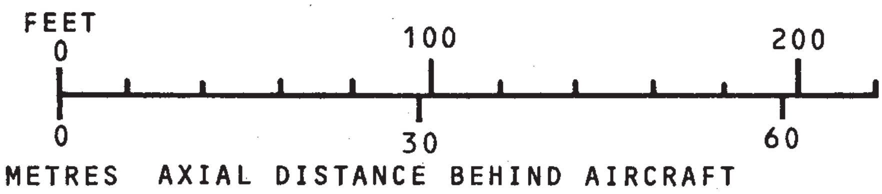
EXHAUST VELOCITY CONTOURS, BREAKAWAY POWER

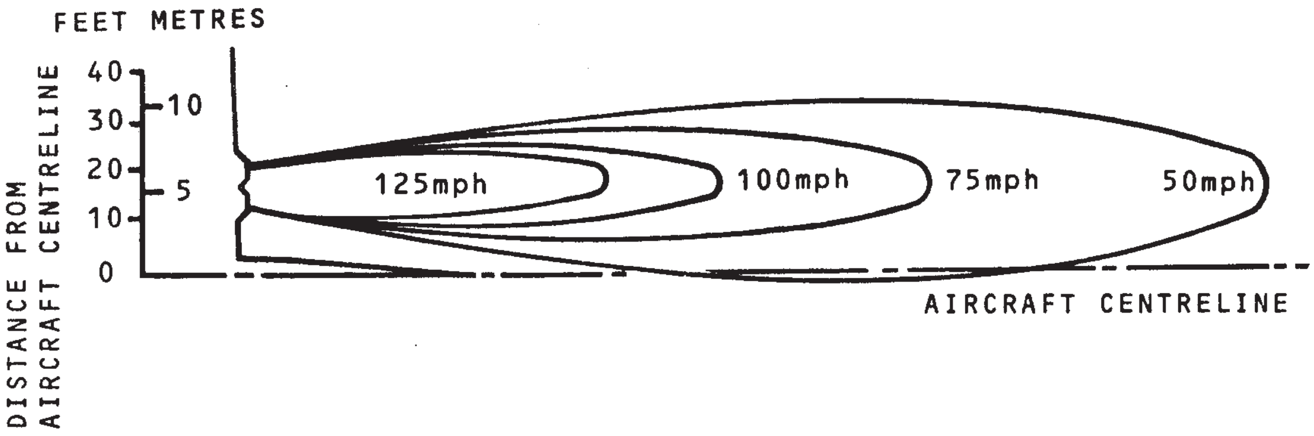
ELEVATION



NOTE: ALL VELOCITY VALUES ARE STATUTE MILES PER HOUR SEA LEVEL STATIC

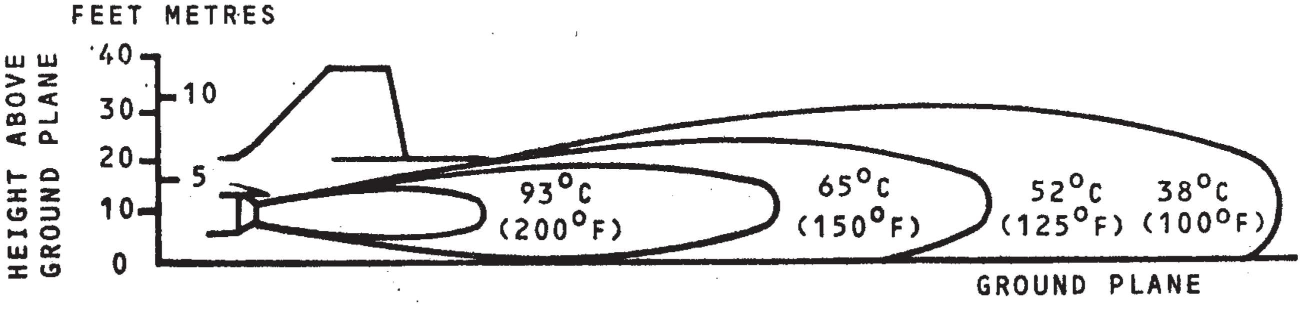


PLAN

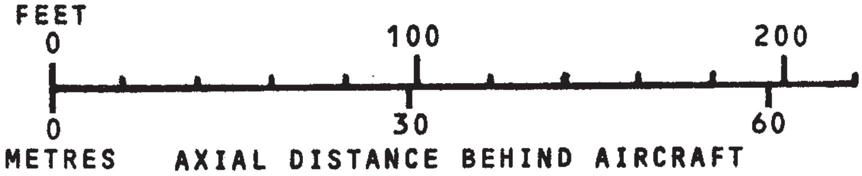


EXHAUST TEMPERATURE CONTOURS, BREAKAWAY POWER

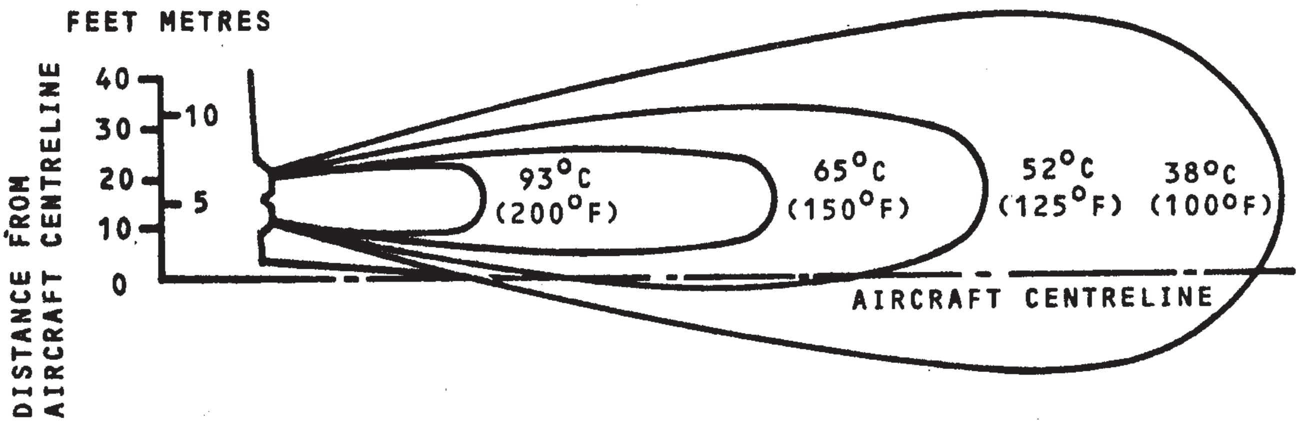
ELEVATION



NOTE: SEA LEVEL STATIC



PLAN



GENERAL

The flight compartment warning concept includes an audio warning system, a master warning system and individual warnings and indications within associated systems. The warning and indications are divided into four categories.

(1) Class 1. Warnings of serious faults or emergency conditions requiring to be brought to the immediate attention of the crew. Immediate action is generally required.

(2) Class 2. Warnings of less serious faults or abnormal conditions requiring to be brought to the immediate attention of the crew. Immediate action not generally required.

(3) Class 3. Abnormal or fault conditions requiring monitoring which may, if left unattended, result in a class 2 warning.

(4) Class 4. Miscellaneous indications.

The class 1 and 2 warnings are presented by the audio and master warning system display panels with associated display on the systems management panel.

Audio Warnings

A number of distinctive audio warnings are used to give an audible indication of class 1 and 2 warnings. The audio warnings are relayed via the flight compartment loudspeaker system. Facilities are provided to cancel certain warnings but others can only be cancelled by rectification of the fault condition.

Visual Warnings and Indications

The colour of the warnings and indication given is determined by the classification of the warning/indication:

(1) Class 1. Red

(2) Class 2. Amber

(3) Class 3. Yellow

(4) Class 4. Blue, Green or White

Master Warning System

The Master Warning System (MWS) gives visual warning and system identification of class 1 and class 2 failures. A single stroke gong calls attention to a master warning light.

Each master warning light on the MWS panel monitors a number of warning sources. The light can be cancelled by rectifying the fault or, by pressing the light, the CANCEL/LTS TEST push button or the MWS CANCEL push button. The gong will operate for each fault whether or not the associated MWS has been cancelled.

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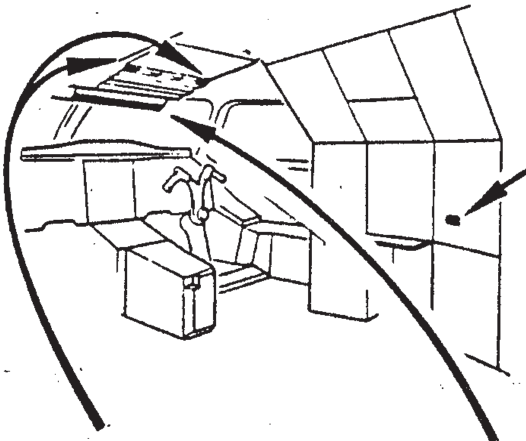
AUDIO & MASTER WARNINGS

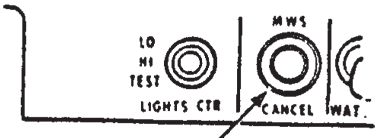
If any red MWS light remains on and is unrecognized, a further single stroke gong will sound every ten seconds. Loss of the primary gong or total loss of the MWS is indicated by operation of the health monitor gong at one second intervals.

The MWS amber lights, certain red lights and the associated primary gong, can be inhibited from the MWS panel. A recall facility is provided which relights a MWS warning light that has previously been cancelled or inhibited but is still receiving a fault signal.

Individual system fault indication lights associated with the master warning system, having a letter T engraved in the bottom left corner, can be pressed to test the light and its associated master warnings.

AUDIO AND MASTER WARNINGS

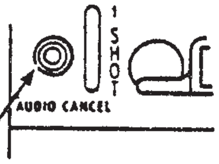




MWS CANCEL PUSH BUTTON

Pressing - causes complete cancellation of the master warning lights.

NOTE: The MWS CANCEL push button and CANCEL/LTS TEST push button should only be used during the Pre-Flight phases.



AUDIO CANCEL SWITCH (2)

Pressing - cancels all audio warnings with the exception of the following:

Overspeed audio (warble) and L/gear horn (if nose is below 12°)

CANCEL/LTS TEST PUSH BUTTON

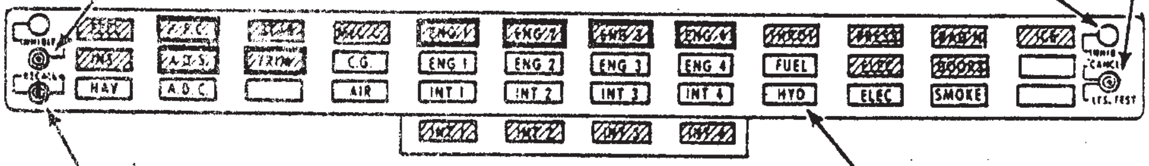
Pressing - tests the master warning lights filaments.
Releasing - causes complete cancellation of the master warning lights.

INHIBIT PUSH BUTTON

Pressing - inhibits the excess cabin altitude specific audio warning and all master warnings with the exception of the following red lights and associated audios (gong):
ADS, TRIM, PFC, ENG.1, ENG.2, ENG.3, ENG.4.

INHIBIT LIGHT (Amber) (2)

On - indicates the inhibit function is operating.



RECALL PUSH BUTTON

Reinstates all valid master warning lights and cancels the INHIBIT function but does not recall the associated MWS primary gong

MASTER WARNING LIGHTS (37)

Pressing the relevant light cancels the existing warning and keeps the light available for other warnings from that system.
The system panel lights will remain on until the malfunction is corrected.

(Unchanged)

AUDIO & MASTER WARNINGS

RED WARNING PARTICULARS

SYSTEM	AURAL WARNING CHARACTERISTIC	VISUAL INDICATION	CONDITION INDICATED
Power Plant	Single stroke gong	MWS ENG 1 lt (red) ENG 2 ENG 3 ENG 1	
	AND		
	Distinctive fire warning audio (bell)	Appropriate engine shut down handle lt (red) flashing	than an engine fire has been detected.
	Single stroke gong	Engine shut down handle lt (red) on steady	high temperature in the engine turbine cooling air system, or, low pressure in the engine oil system, or, an overheat condition within the engine, or, flame breakout from the combustion chamber, or, a fluid leak into the bay above the engine.
		Red warning light on OIL ENG instrument	On indicates that the engine oil pressure is less than 15 psi
		LEAK lt (red) (4)	that a leakage of fluid into the bay above the engine has been detected.
		TCA HIGH TEMP lt (red)	that a high temperature exists in the turbine cooling air system.
		Engine O/HEAT lt (red) (4)	that a high temperature exists at No.2 and No.3 bearing air vent or No.4 and No.5 bearing cold vent or No.5 bearing hot vent or No.12 labyrinth seal vent, or, a combustion chamber flame breakout exists, and is accompanied by a MWS ENG 1t (amber)

(continued)

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AUDIO & MASTER WARNINGS

RED WARNING PARTICULARS

SYSTEM	AURAL WARNING CHARACTERISTIC	VISUAL INDICATION	CONDITION INDICATED
Power Plant (continued)	Single stroke gong	MWS THROT lt (red)	
		THROT 1-4 lt (red) and associated THROTTLE MASTER sel lt (red)	that the selected throttle control system has failed
	Single stroke gong	MWS INT 1 lt (red) INT 2 INT 3 INT 4	(all MWS INT reds on) (without INT lts, when) (any one AICS ground/) (flight sw at GROUND.)
		INT lt (red)	that the air intake, ramp and spill doors are not under the control of the associated air intake automatic control system
		Intake test ON lt (red)	that the test master switch is operated
Flight Controls	Single stroke gong	MWS PFC lt (red)	
		BLUE FAIL lt (red) GREEN FAIL lt (red)	that the relay jack spool valve has jammed
		BLUE INVERTER fail lt (red) GREEN INVERTER fail lt (red)	that the output from the inverter is outside limits and the d.c. supply has been cut
		BLUE JAM lt (red) GREEN JAM lt (red)	that a PFCU spool valve has jammed
		Channel MIs (2 or 4) show G or M	
		Flight Control position indicator (2 or 4) (red)	that on the corresponding flight control surface group, a channel change-over has been signalled by the comparator system. The warning lights remain on steady until an ALARM RESET is made.
		MECH JAM lt (red)	a mechanical channel jamming downstream of the pitch or roll relay jack
		BLUE L/PRESS lt (red)	a low pressure downstream of the blue system PFC servos selector, or, if YELLOW BLUE is selected low pressure downstream of the yellow/blue PFC servos selector.

(Continued)

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RED WARNING PARTICULARS

SYSTEM	AURAL WARNING CHARACTERISTIC	VISUAL INDICATION	CONDITION INDICATED
Flight Controls (continued)		GREEN L/PRESS lt (red)	a low pressure downstream of the green systems PFC servos selector or, if YELLOW GREEN is selected low pressure downstream of the yellow/green PFC servos selector
		INNER ELEV lt (red)	inner elevon desynchronisation
	Single stroke gong	MWS TRIM lt (red)	
		ELECTRIC TRIM sw drops to off	that the electric trim systems have failed
	Single stroke gong	MWS. FEEL lt (red)	
		Artificial feel system No.1 and No.2 (PITCH ROLL or YAW) sws drop to off	loss of both artificial feel systems on one axis.
	Single stroke gong	MWS STAB lt (red)	loss of both autostab systems on one axis
		autostab No.1 and No.2 PITCH, ROLL or YAW sws drop to off	
Navigation	Single stroke gong	MWS ADS lt (red)	that a discrepancy has been sensed by the comparator system of both air data computers
		Failure flag on ASI if functioning in normal mode Red AUTOLAND lt in LAND or GLIDE mode and aircraft below 600 ft	ADS discrepancy in computed speed
	Single stroke gong	MWS INS lt (red) INS 1, 2 or 3 lt (red)	An INS internal auto detected failure or, a failure detected by the comparator on attitude outputs or, vertical acceleration (if LAND or GLIDE mode selected and altitude less than 600 feet) or, compass coupler 1 and 2 with INS 3 platform heading (if land mode selected and altitude less than 600 feet)

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AUDIO & MASTER WARNINGS

RED WARNING PARTICULARS

SYSTEM	AURAL WARNING CHARACTERISTIC	VISUAL INDICATION	CONDITION INDICATED
Electrical	Single stroke gong	MWS ELEC lt (red)	
		AC ESS BUS lt (red)	a failure of supply at the a.c. essential busbar
		DC ESS BUS lt (red)	that the d.c. essential busbar is not supplied
		Emerg gen O/HEAT lt (red)	an emergency generator stator or bearing high temperature
Air Conditioning	Single stroke gong	MWS PRESS lt (red)	
		O/PRESS lt (red)	that cabin differential pressure exceeds 11 psi (758 mb)
	Intermittent horn	EXCESS ALT lt (red)	that the cabin altitude is above 10,000 ft
Airplane General Doors	Single stroke gong	MWS DOORS lt (red) FRONT LEFT FRONT RIGHT UPPER CARGO CENTRE LEFT CENTRE RIGHT REAR LEFT REAR RIGHT LOWER CARGO doors lts (red)	ON if individual door not locked shut
		MISC HATCHES lt (red)	ON if the four servicing hatches are not all shut
Fuel System M/CG	Single stroke gong	MWS M/CG lt (red) Red warning light on both CG indicators AND Red M/CG lights in front of each pilot	Infringement of either forward or aft boundary of the defined CG corridor.
	Single stroke gong	MWS M/CG lt (red) Red warning light on both CG indicators and red M/CG lights in front of each pilot NOTE: over the range M 0.45 to M 1.6 the red warning light on both CG indicators and red M/CG lights in front of each pilot, flash and stick shaker operates EXCEPT IF $V_C \geq V_{MO}$ - 7kt	Infringement of aft extreme boundary (MWS M/CG light repeated if cancelled from previous infringement.) (continued)

AUDIO & MASTER WARNINGS

RED WARNING PARTICULARS

SYSTEM	AURAL WARNING CHARACTERISTIC	VISUAL INDICATION	CONDITION INDICATED
Fuel System M/CG (continued)	Single stroke gong	MWS M/CG lt (red) AND the red warning light on both CG indicators, and red M/CG lights in front of each pilot flash	Infringement of forward extreme boundary (MWS M/CG light repeated if cancelled from previous forward infringement)
Ice & Rain Protection	Single stroke gong	MWS ICE lt (red) ICE lt (red)	that icing conditions have been detected and one or more ENGINE ANTI-ICING switches are at OFF or both the MAIN and ALTERN WING & INTAKE ANTI-ICING rotary selectors are at OFF
Flight Instruments Radiation Detection	Single stroke gong	MWS RADN lt (red) Red lt on radiation meter	When 50 and above millirems per hour displayed on meter.

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AUDIO & MASTER WARNINGS

AMBER WARNING PARTICULARS

SYSTEM	AURAL WARNING CHARACTERISTIC	VISUAL INDICATION	CONDITION INDICATED
Power Plant	Single stroke gong	MWS ENG 1 lt (amber) ENG 2 ENG 3 ENG 4	
		Engine vibration warning lt (amber)	an engine front bearing vibration level greater than 5 ins/sec, or, a rear (jet pipe) vibration level greater than 4 ins/sec
		FUEL FILTER lt (amber)	an excess differential pressure across the engine fuel filter
		NAC/WING O/HEAT lt (amber)	an overheat condition in the wing rear equipment bay over an engine or in an engine bay
		Fuel HIGH TEMP lt (amber)	that a high fuel temperature exists in the fuel burner manifold
		Oil temp instrument warning lt (amber)	that a high temperature exists in the engine oil entering the oil pressure pump
		FIRE SENSOR lt (amber)	a fault exists on one of the two fire detection loops of the engine
		FLAME SENSOR lt (amber)	with the FLAME SENSOR selector at BOTH indicates that one of the two engine flame breakout detection loops is signalling a warning
	Single stroke gong	MWS INT 1 lt (amber) INT 2 INT 3 INT 4	
		N_1 SIG lt (amber)	a failure of the LP spool speed signal to the intake control unit in use
		LANE lt (amber)	a failure of the associated intake lane A or B whether it is in use or not
		HYD lt (amber)	a failure of the main hydraulic operation of the associated intake
		α lt (amber)	a failure of the aircraft incidence signal to one or more of the intake control units in use

(continued)

AUDIO & MASTER WARNINGS

AMBER WARNING PARTICULARS

SYSTEM	AURAL WARNING CHARACTERISTIC	VISUAL INDICATION	CONDITION INDICATED
Power Plant (continued)	Single stroke gong	& lt contd.	NOTE: As the alpha light may be on for failure of the incidence signal to any intake the MWS INT light is the only positive indication of the affected intake(s)
		amber light in the N_1 indicator	a failure of the intake to control N_1
Fuel System	Single stroke gong	MWS FUEL lt (amber)	
		Fuel LOW PRESS lt (amber)	that a low pressure condition exists upstream of the engine pump
		LOW LEVEL lt (amber)	that a low level condition exists in a collector tank
		TANK PRESS lt (amber)	one of these conditions: the fuel vent gallery to atmosphere differential pressure is high and rising, or, low and falling or, the vent gallery absolute pressure is below 2 psi at altitude
Fuel System (M/CG)	Single stroke gong	MWS CG (lt amber)	
		Amber captions 1, M or 2 on FQI control panel	failure of selected CG channel
Hydraulics	Single stroke gong	MWS HYD lt (amber)	
		Pump L/PRESS lts (amber)	a low pressure condition downstream of the engine driven pump
		L/LEVEL lt (amber)	on when the hydraulic fluid quantity gauge pointer reaches the upper gap in the yellow band on the blue or green hydraulic system reservoir
		O/HEAT lt (amber)	comes on when the hydraulic temperature in a hydraulic reservoir exceeds 140 deg C
Navigation	Single stroke gong	MWS ADC lt (amber)	
		ADC 1 or 2 lt (amber)	that the ADC monitor system has detected a fault that has remained for 2 seconds or, the power supply has been interrupted for more than 1 second

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AMBER WARNING PARTICULARS

SYSTEM	AURAL WARNING CHARACTERISTIC	VISUAL INDICATION	CONDITION INDICATED
Electrical	Single stroke gong	MWS ELEC lt (amber)	-
		CSD 1-4 lt (amber)	a low oil pressure in the constant speed drive
		GEN 1-4 lt (amber)	the generator control breaker is not connecting the generator to the associated a.c. main bus bar
		AC MAIN BUS 1-4 lt (amber)	a failure of supply to the main a.c. busbar
		DC MAIN BUS lt (amber)	that one or both parts of the busbar are at less than 25 volts and are automatically disconnected from the associated d.c. essential busbar
		BATT ISOLATE lt (amber)	that the battery is disconnected from its associated d.c. essential busbar
Air Conditioning	Single stroke gong	MWS AIR lt (amber)	
		OVER PRESS lt (amber)	that the air pressure downstream of the corresponding bleed valve exceeds 85 psi
		PRIM EXCH lt (amber)	that the air temperature downstream of the primary exchanger exceeds 220 deg C
		SEC EXCH lt (amber)	that a high temperature exists downstream of the secondary exchanger
		DUCT lt (amber)	that a high temperature exists downstream of the fuel/air heat exchanger, or, the temperature downstream of the cold air unit exceeds 120 deg C, or, a high differential pressure exists between the cold air unit outlet and the pressurised fuselage May also indicate a high temperature exists in the duct upstream of the distribution manifold
		Fwd extract FLOW left hand lt (amber) Fwd extract FLOW right hand lt (amber)	that the mass flow upstream of the three forward extract fans is below approximately 50% normal.
		Rear extract FLOW lt (amber)	that the mass flow upstream of the three rear extract fans is below approximately 50% normal (continued)

(Unchanged)

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AUDIO & MASTER WARNINGS

AMBER WARNING PARTICULARS

SYSTEM	AURAL WARNING CHARACTERISTIC	VISUAL INDICATION	CONDITION INDICATED
Air Conditioning (continued)	Single stroke gong	MWS SMOKE lt (amber) SMOKE CABIN & FREIGHT HOLD lts (amber)	that smoke is detected in an areas as follows: A. left forward electrical racking, B. forward cabin pressurisation discharge valves, C. forward lower freight hold, D. left rear electrical racking, E. rear cabin pressurisation discharge valves, F. right rear electrical racking, G. upper rear freight hold, H. right underfloor electrical racking, J. right forward electrical racking, K. left underfloor electrical racking. NOTE: More than one light may be on as a result of smoke emanating from a single source
Air Conditioning Smoke	Single stroke gong	MWS SMOKE and AIR lts (amber) SMOKE 1, 2, 3 or 4 lt (amber)	that smoke has been detected in the associated AIR GENERATION GROUP

AUDIO & MASTER WARNINGS

Audio warnings with no associated master warning

SYSTEM	AURAL WARNING CHARACTERISTIC	VISUAL INDICATION	CONDITION INDICATED
Selcal	Two tone chime repeated every 5 secs	SELCAL lt (blue) flashing	Selcal
MWS HEALTH MONITORING	Continuous single stroke gongs		total loss of the MWS or malfunction of the single stroke gong. Cancellation of this tone can be accomplished by the normal audio cancel push button
MWS Auxiliary Warning	Single stroke gong (functions every 10 sec)		that a class 1 (red) light remains illuminated and unrecognised
Autopilot Disconnect	Cavalry Charge	AP lts (2) (red)	failure of an autopilot or two autopilots in LAND mode.
A/C Overspeed	Warble		The visor down and nose down more than 5° at speeds greater than 270 kt or, the visor not locked up at speeds greater than M = 0.95 or, aircraft attitude nose down pitch is greater than 6° at speeds greater than M = 1.0 or, aircraft speed has exceeded $V_{MO}/M_{MO}/T_{MO}$ limit
Altitude Alert	C Chord 1-5 sec. burst	Amber altitude lights on each pilots' altimeter	the approach to and divergence from a selected altitude
Landing Gear	Continuous horn		landing gear not selected down, or, any landing gear not locked down, AND Aircraft less than 180 kt AND Any two throttles less than 95% NOTE: The continuous warning cannot be cancelled if the droop nose is at DOWN in addition to the other stated condition

(Unchanged)

AUDIO & MASTER WARNINGS

SYSTEM	AURAL WARNING CHARACTERISTIC	VISUAL INDICATION	CONDITION INDICATED
Ground Proximity Warning System	"Whoop Whoop pull up", repeated	PULL UP lights (2) (red)	PULL UP lights (2) (red) On flashing - indicates Mode 1 - excessive rate of descent near the ground (active below 2500 ft) or Mode 2 - excessive closure rate with the ground or Mode 3 - loss of altitude when the aircraft is below 700 ft after take-off or go-around or Mode 4 - proximity to the ground with the landing gear retracted (active below 500 ft)
	Audio Tones not associated with the audio warning system		
Ground Proximity Warning System	"Glideslope" repeated	NIL	Mode 5 - inadvertent duck under the glidescope during approach. NOTE - from 1000 feet to 300 ft the audio warning is 'soft' The audio warning is repeated at an increasing rate as the mode 5 envelope is penetrated more deeply. Below 300 ft the audio warning is 'hard'. A 'soft' warning will disappear if the aircraft is brought back onto the glideslope.

TEMPORARY REVISION
Insert Facing 01.03 Page 14

REASON FOR ISSUE!

Fitment of Marconi-Litton GPWS.

SYSTEM	AURAL WARNING CHARACTERISTIC	VISUAL INDICATION	CONDITION INDICATED
Ground Proximity Warning System	"Whoop Whoop pull up", repeated	Pull up lights (2) (red)	Pull up lights (2) (red) on flashing - indicates Mode 1 - excessive rate of descent near the ground (active below 2500 ft) or Mode 2 - excessive closure rate with the ground or Mode 3 - loss of altitude when the aircraft is below 700 ft after take-off or go-around or Mode 4 - proximity to the ground with the landing gear retracted (active below 500 ft) or nose not fully down below 200 ft.

Audio Tones not associated with the audio warning system

Ground Proximity Warning System	"Glideslope" repeated	NIL	Mode 5 - indavertent duck under the glidescope during approach.

AUDIO & MASTER WARNINGS

Audio Tones not associated with the audio warning system (continued)

SYSTEM	AURAL WARNING CHARACTERISTIC	VISUAL INDICATION	CONDITION INDICATED
Airplane General	Low tone Two stroke, two tone (high low) High tone		Seat belts and No smoking signs Attendant (passenger to steward) Crew to passenger
Emergency Equipment	Two tone bleeper	Red flashing lt in roof panel (flight deck) Red flashing lts (3) one in each vestibule cabin staff panel.	Evacuation alert
Flight Controls	Rattle	Stick shaker	Stall warning (16.5 deg incidence or AFT M/CG warning or V_C less than V_{LA} - 20kt)
Navigation Markers	High interphone tone (continuous) High interphone tone (pulsating) Medium interphone tone Low interphone tone		Airways marker Inner marker Middle marker Outer marker
Navigation INS	Flight deck to ground crew horn		INS running without cooling air
Navigation Radio Altimeter	Continuous high tone, horn increasing in volume.		Approach to decision height; the warning cancels at the decision height.

(Deletion)

DOORS

GENERAL

The aircraft has two passenger and four cabin service exterior doors, upper and a lower baggage compartment doors and several miscellaneous ground servicing doors. The interior doors consist of four lavatory doors and a flight deck door. All the doors are operated manually.

DESCRIPTION

Passenger and Service Doors

Two outward opening doors in the left-hand side of the fuselage, one forward and the other midway along the passenger compartment, provide normal entry and exit for passengers and crew, and may be opened from inside or outside the aircraft.

Four outward opening doors, two in the right-hand side of the fuselage opposite the passenger doors, and two, one each side of the fuselage, at the rear end of the passenger compartment, provide access to crew and passenger compartment for servicing between flights, and may be opened from either inside or outside the aircraft.

All the doors may be used for emergency evacuation of the aircraft and are provided with escape equipment (Refer to Chapter 7 for description of escape and emergency equipment).

The two passenger doors and the intermediate cabin service door are fitted with slide/raft escape facilities, while the forward and two rear cabin service doors are fitted with escape slide only. Each forward passenger and forward cabin service door is fitted with an observation window.

Baggage Compartment and Miscellaneous Doors.

The upper baggage compartment door is normally opened from outside but a means of opening the door from inside by an emergency handle is provided. When not in use the handle is clipped to the door surround structure. To retain the door in its fully open position it is necessary to utilize a separately stowed retention pin.

The lower baggage compartment and miscellaneous doors can only be opened from outside.

Flight Deck Door

An electrically operated lock striking plate controlled by a switch on the flight compartment roof panel, provides the crew with an independent means of unlocking the door. The door can be opened from inside the flight compartment at any time by turning the door knob, and from the cabin side only by a key. The door is fitted with a manually operated latch bolt, a mirror, and a cabin observerscope on the forward face.

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Lavatory Doors

The operation of all lavatory doors is manual and self explanatory. A locked door can be removed from outside of the compartment if necessary without the use of special tools.

Door Warning

The door warning system is an automatically controlled electrical system which, when a door in the pressure hull is not properly locked in position, gives an indication on the door warning panel located at the flight engineer's panel. The master warning system is also activated when the door warning operates.

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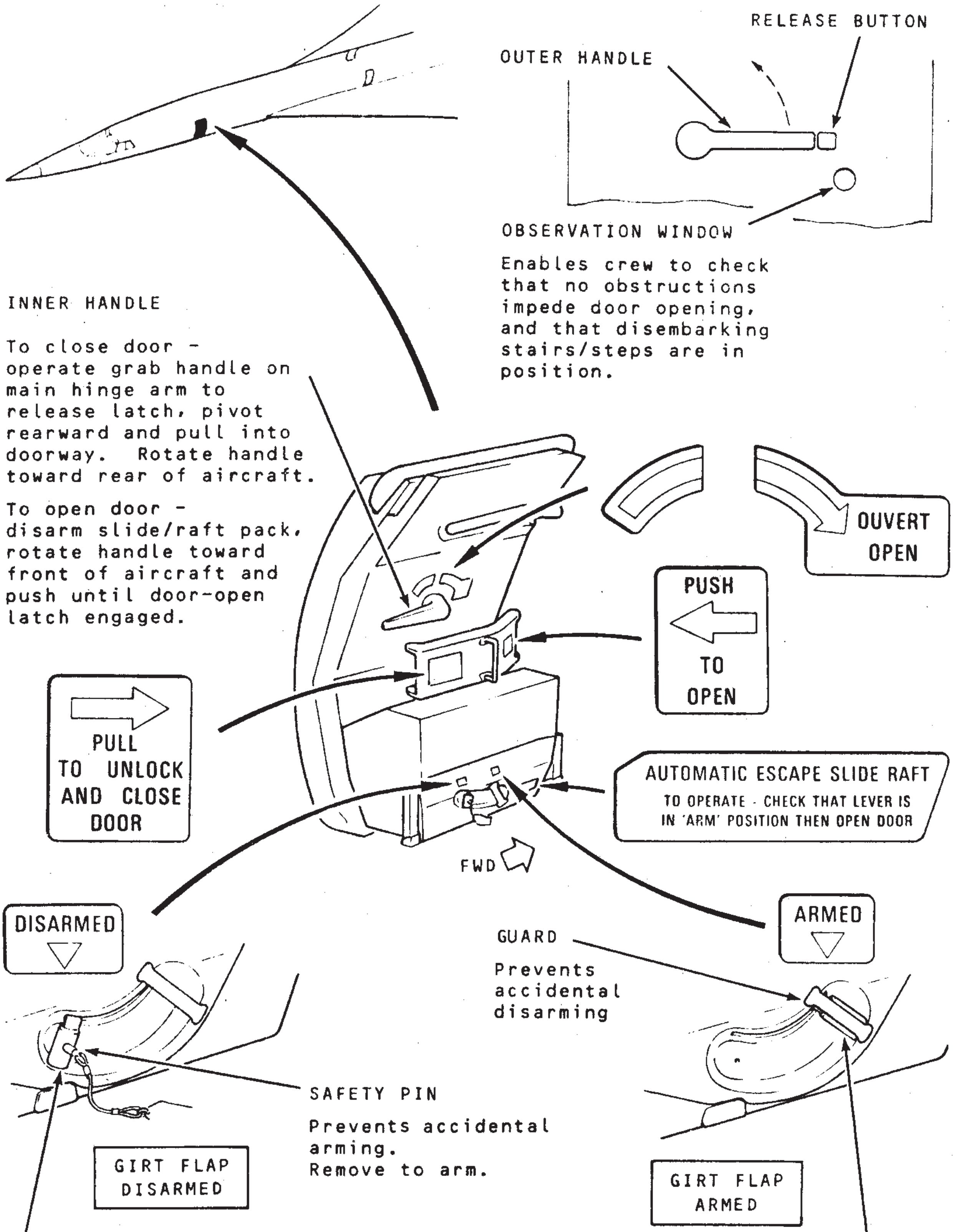
FORWARD PASSENGER DOOR



OBSERVATION WINDOW

Enables crew to check that no obstructions impede door opening, and that disembarking stairs/steps are in position.

INNER HANDLE

To close door - operate grab handle on main hinge arm to release latch, pivot rearward and pull into doorway. Rotate handle toward rear of aircraft.

To open door - disarm slide/raft pack, rotate handle toward front of aircraft and push until door-open latch engaged.

GUARD

Prevents accidental disarming

SAFETY PIN

Prevents accidental arming.
Remove to arm.

SLIDE/RAFT ARMING LEVER

DISARMED - slide/raft is disarmed. Door can then be opened without deploying slide/raft.

SLIDE/RAFT ARMING LEVER

ARMED - slide/raft is armed and deploys when door is opened.

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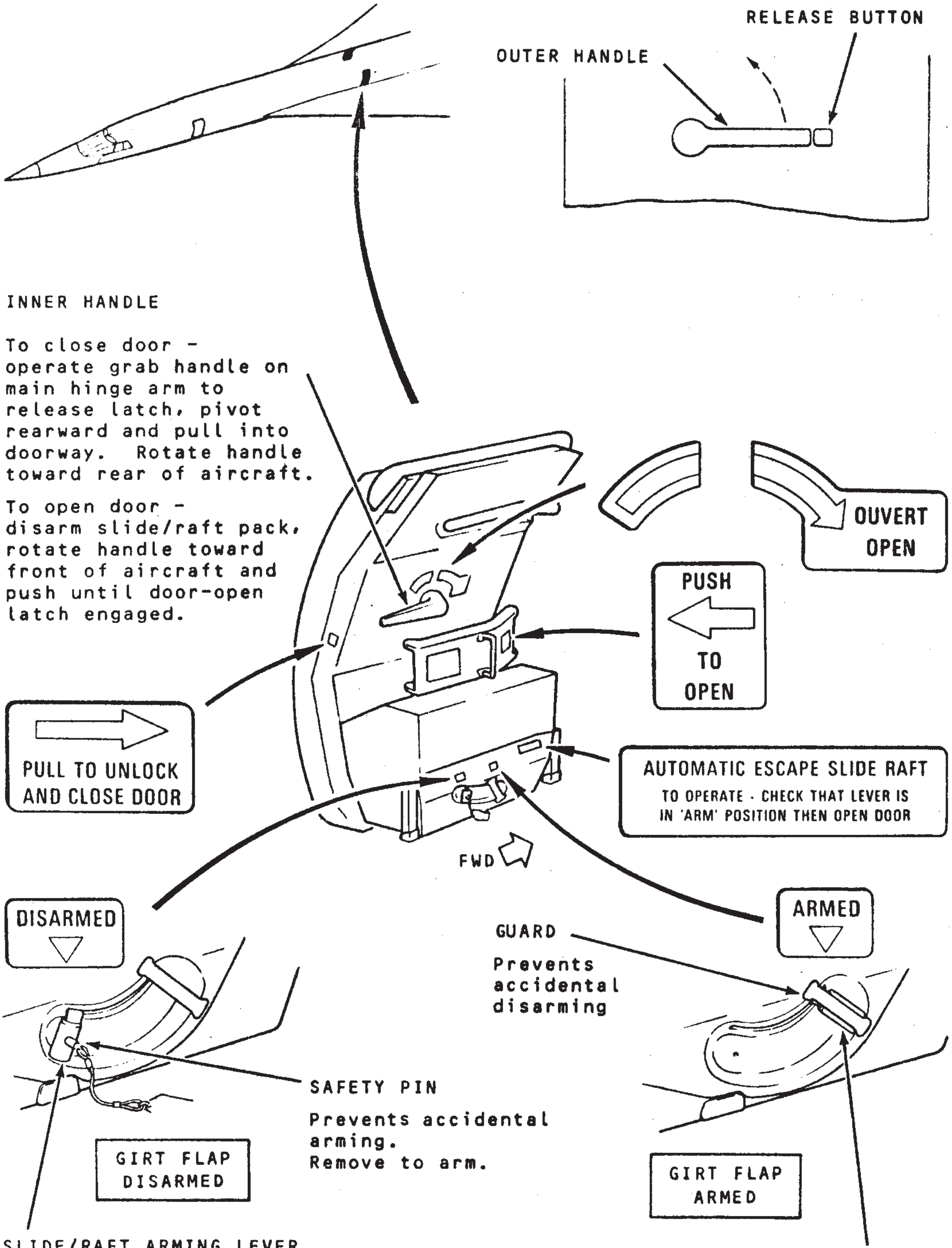
INTERMEDIATE PASSENGER DOOR


RELEASE BUTTON
OUTER HANDLE
OUVERT
OPEN
PUSH
TO
OPEN
PULL TO UNLOCK AND CLOSE DOOR
AUTOMATIC ESCAPE SLIDE RAFT
TO OPERATE - CHECK THAT LEVER IS IN 'ARM' POSITION THEN OPEN DOOR
FWD
DISARMED
ARMED
GIRT FLAP DISARMED
GIRT FLAP ARMED

INNER HANDLE

To close door - operate grab handle on main hinge arm to release latch, pivot rearward and pull into doorway. Rotate handle toward rear of aircraft.

To open door - disarm slide/raft pack, rotate handle toward front of aircraft and push until door-open latch engaged.

GUARD

Prevents accidental disarming

SAFETY PIN

Prevents accidental arming.
Remove to arm.

SLIDE/RAFT ARMING LEVER

DISARMED - slide/raft is disarmed. Door can then be opened without deploying slide/raft.

SLIDE/RAFT ARMING LEVER

ARMED - slide/raft is armed and deploys when door is opened.

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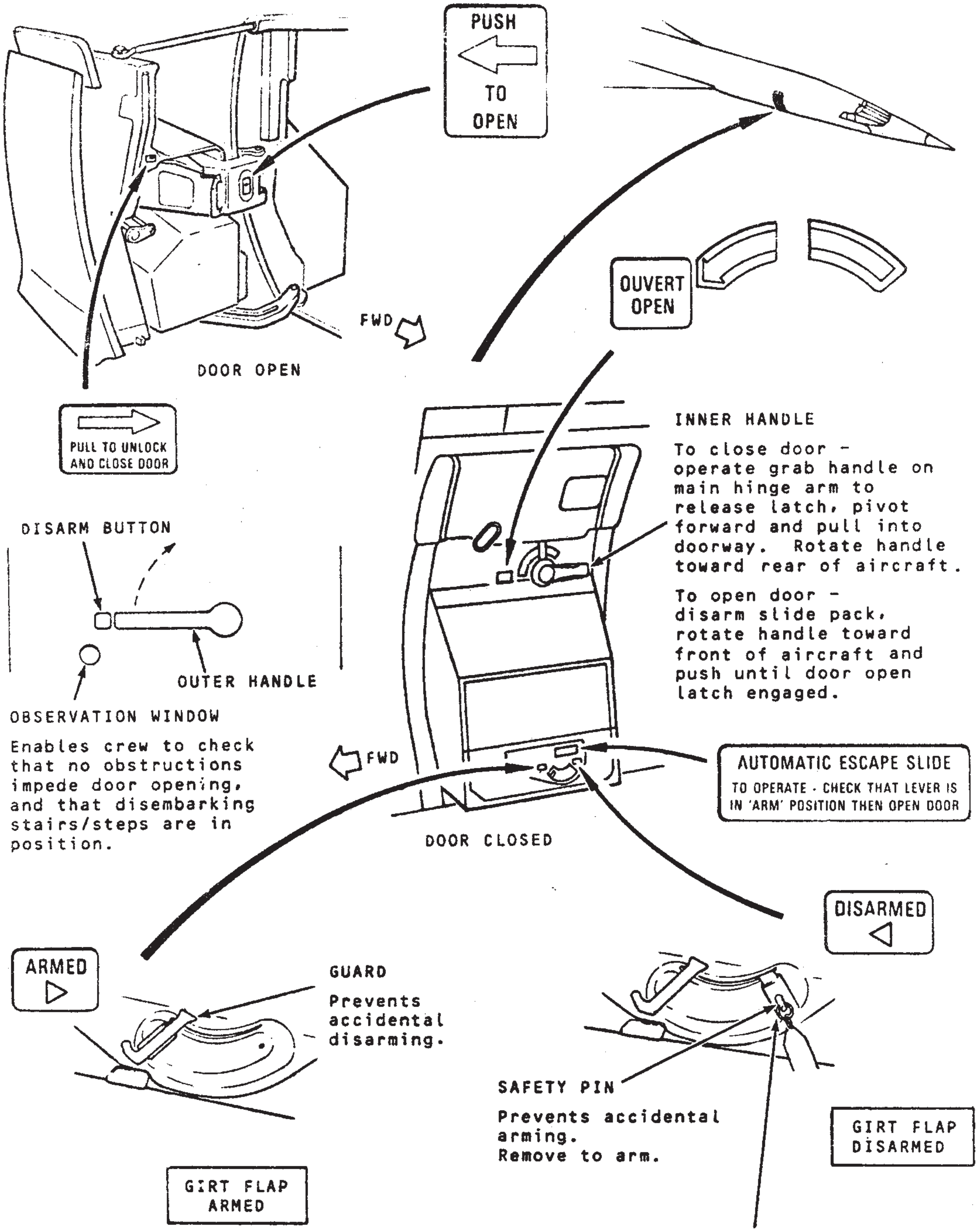
FORWARD SERVICE DOOR



INNER HANDLE

To close door - operate grab handle on main hinge arm to release latch, pivot forward and pull into doorway. Rotate handle toward rear of aircraft.

To open door - disarm slide pack, rotate handle toward front of aircraft and push until door open latch engaged.

OBSERVATION WINDOW

Enables crew to check that no obstructions impede door opening, and that disembarking stairs/steps are in position.

GUARD

Prevents accidental disarming.

SAFETY PIN

Prevents accidental arming.
Remove to arm.

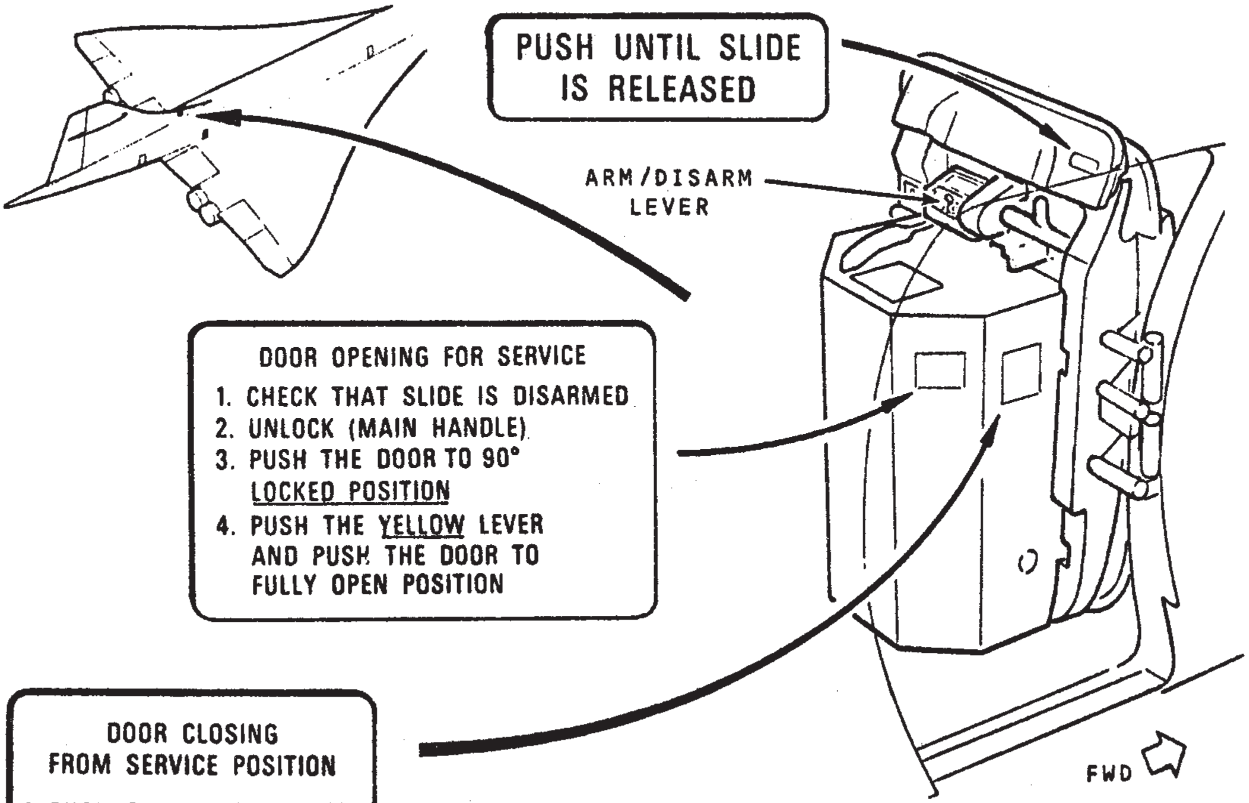
SLIDE/RAFT ARMING LEVER

ARMED - slide/raft is armed and deploys when door is opened.

SLIDE/RAFT ARMING LEVER

DISARMED - slide/raft is disarmed. Door can then be opened without deploying slide/raft.

AFT DOORS (Sheet 1 of 2)



DOOR OPENING FOR SERVICE

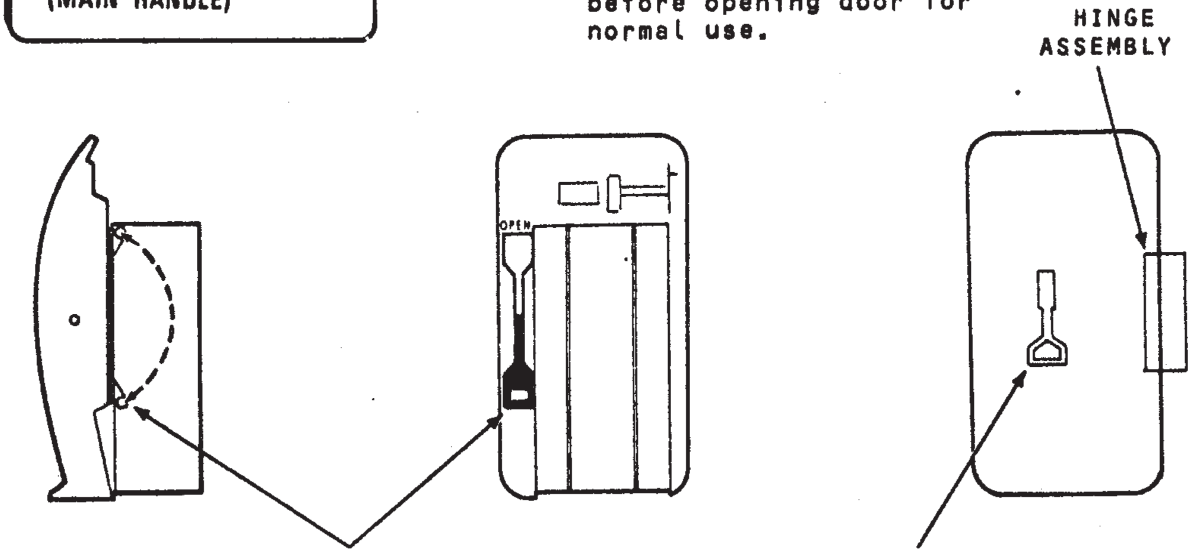
1. CHECK THAT SLIDE IS DISARMED
2. UNLOCK (MAIN HANDLE)
3. PUSH THE DOOR TO 90° LOCKED POSITION
4. PUSH THE YELLOW LEVER AND PUSH THE DOOR TO FULLY OPEN POSITION

DOOR CLOSING FROM SERVICE POSITION

1. PUSH THE YELLOW LEVER AND PULL THE DOOR TO 90° POSITION
2. PULL THE BLUE LEVER AND PULL THE DOOR TO FULLY CLOSED POSITION
3. LOCK IN CLOSED POSITION (MAIN HANDLE)

Door has two open positions. The intermediate position at 90° (shown), for escape slide operation and fully open for easier access during servicing.

NOTE: Slide must be disarmed before opening door for normal use.



INNER HANDLE

Pull handle out and up to open door.

OUTER HANDLE

Push in flap at grip to release lock. Pull out and up to open.

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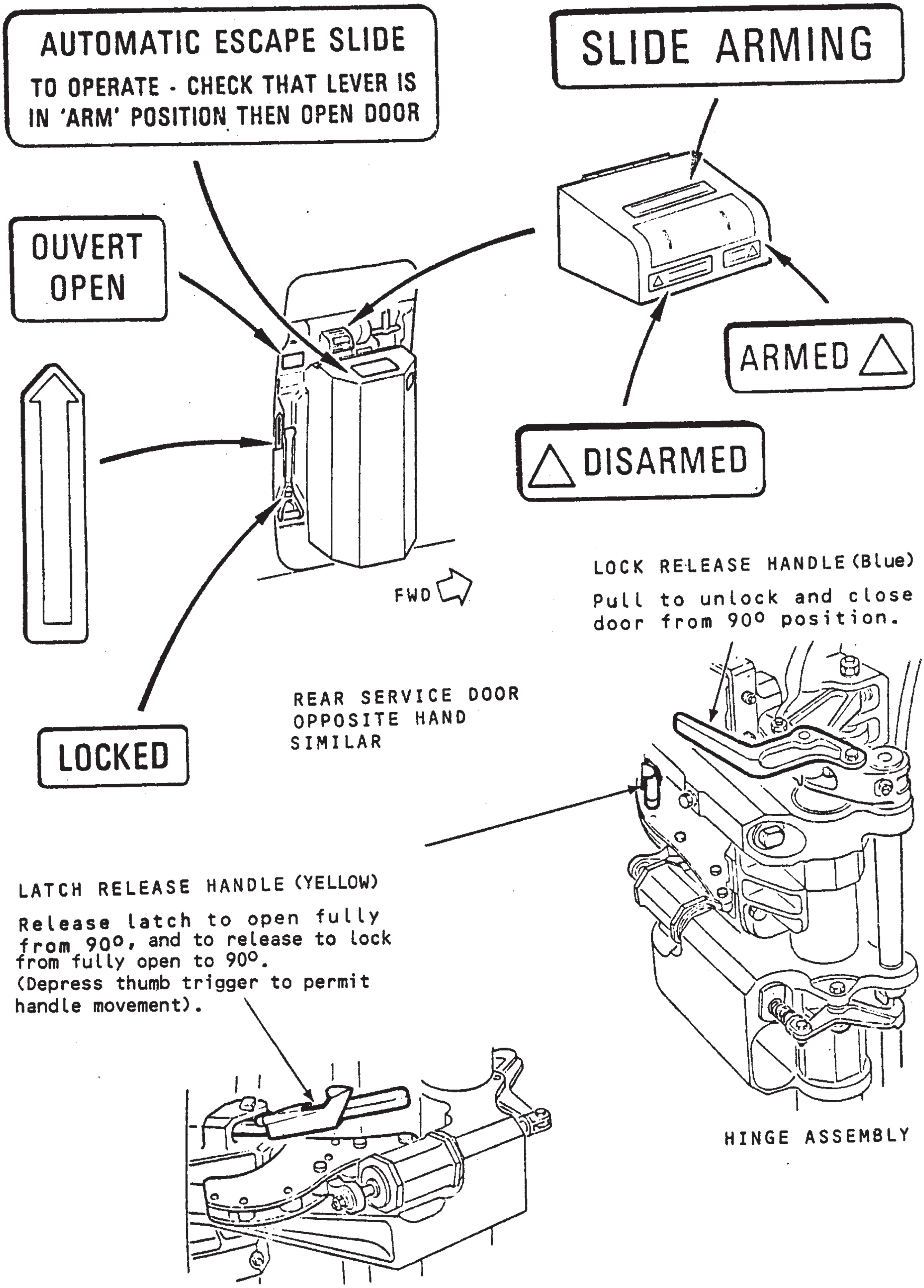
(Unchanged)

AFT DOORS (Sheet 2 of 2)



REAR SERVICE DOOR OPPOSITE HAND SIMILAR

LOCK RELEASE HANDLE (Blue)

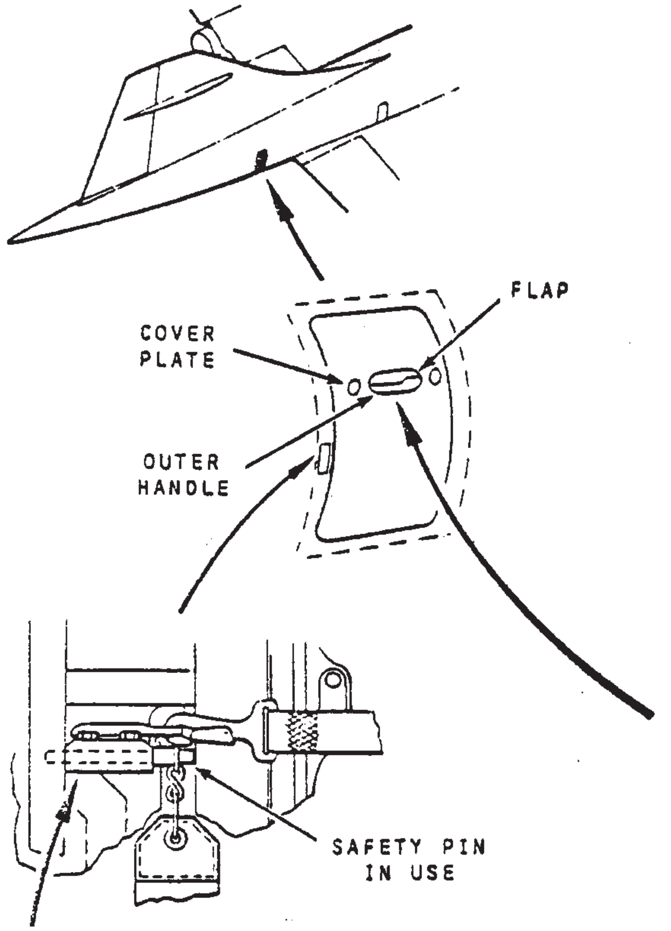
Pull to unlock and close door from 90° position.

LATCH RELEASE HANDLE (YELLOW)

Release latch to open fully from 90°, and to release to lock from fully open to 90°.
(Depress thumb trigger to permit handle movement).

HINGE ASSEMBLY

UPPER AND LOWER CARGO DOORS



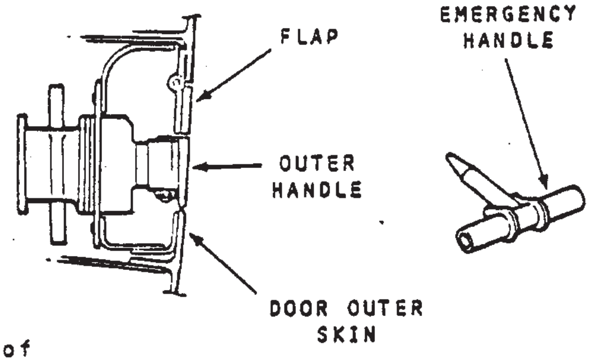
UPPER CARGO DOOR

To open from outside-depress flap over door handle, pull handle out and turn clockwise.

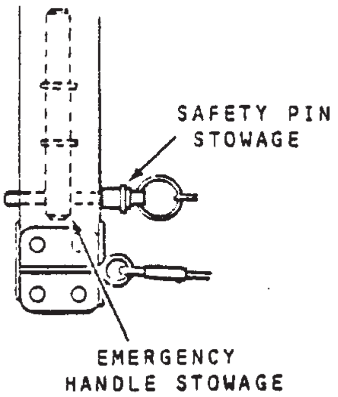
To move door - push in, lift up and over. The door is counterbalanced by cables and spring loaded drum mechanism.

To retain door in its fully open position - use separately stowed retention pin.

NOTE - The door may be opened from inside the baggage compartment by an emergency handle which is inserted into the centre shaft and turned counter clockwise. When not in use the handle is clipped to the door surround structure.

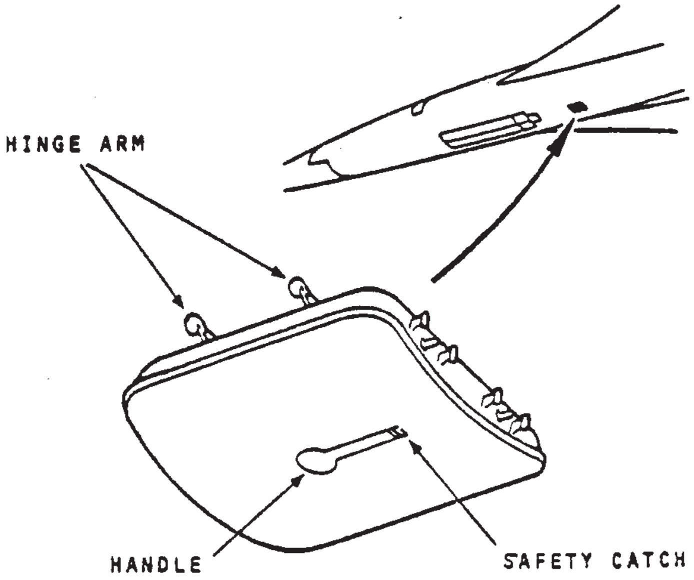


A secondary means of opening the door from outside is by removing two circular cover plates, one each side of the handle, and disconnecting the door lever from the latch bolts.



LOWER CARGO DOOR

Can be opened only from the outside, hinged on the left hand side and counterbalanced by a system of springs and cables.
To open: depress the safety catch on trailing end of handle to spring handle out, pull outward and turn counterclockwise. Door opens inward.



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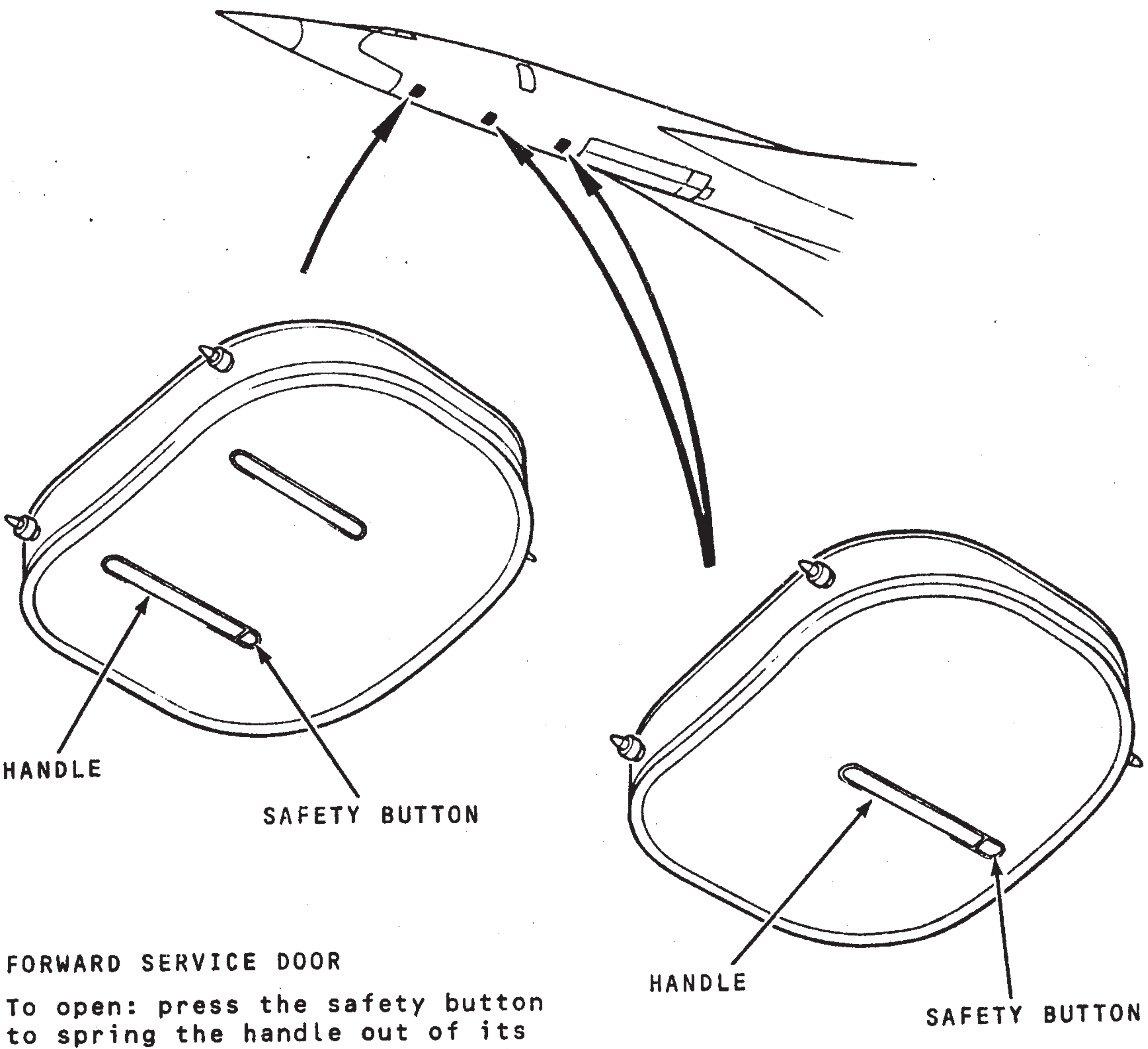
FORWARD UNDER FLOOR
SERVICE COMPARTMENT DOORS



FORWARD SERVICE DOOR

To open: press the safety button to spring the handle out of its recess and pull handle outwards, this action retracts the latch bolts.
The forward service door can then be lifted inward and manoeuvred out of the aperture.

To close: pull handle outwards, this action retracts the latch bolts. Manoeuvre into aperture, push handle inward and stow.

ELECTRONIC BAY ACCESS DOORS

The forward and rear electronic bay access doors are hinged on the left hand side and it is not necessary to remove them after unlatching.

To open: press the safety button to spring the handle out of its recess and pull handle outwards, this action retracts the latch bolts. Push door inwards and latch in the fully open position.

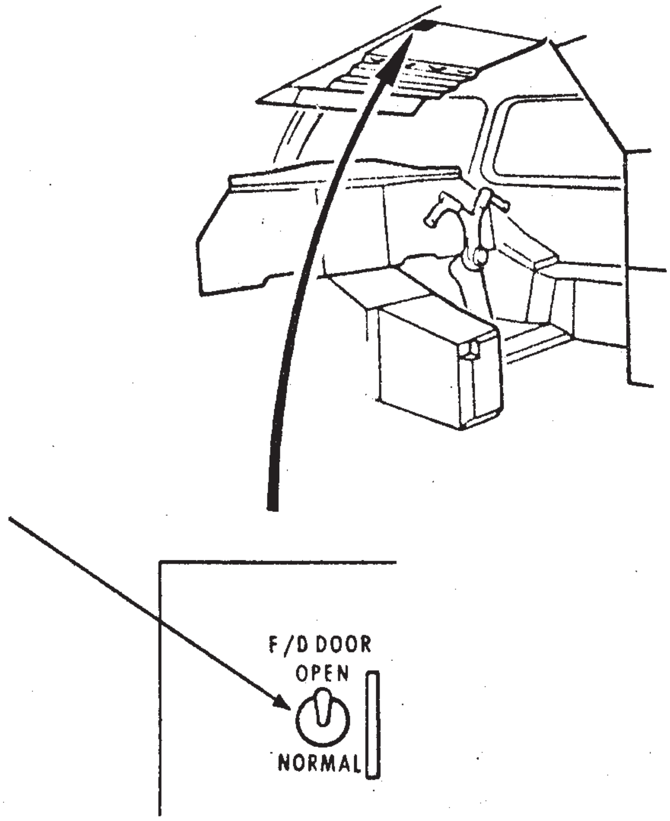
To close: operate the door handle to retract the latch bolts, position door and push handle inward and stow.

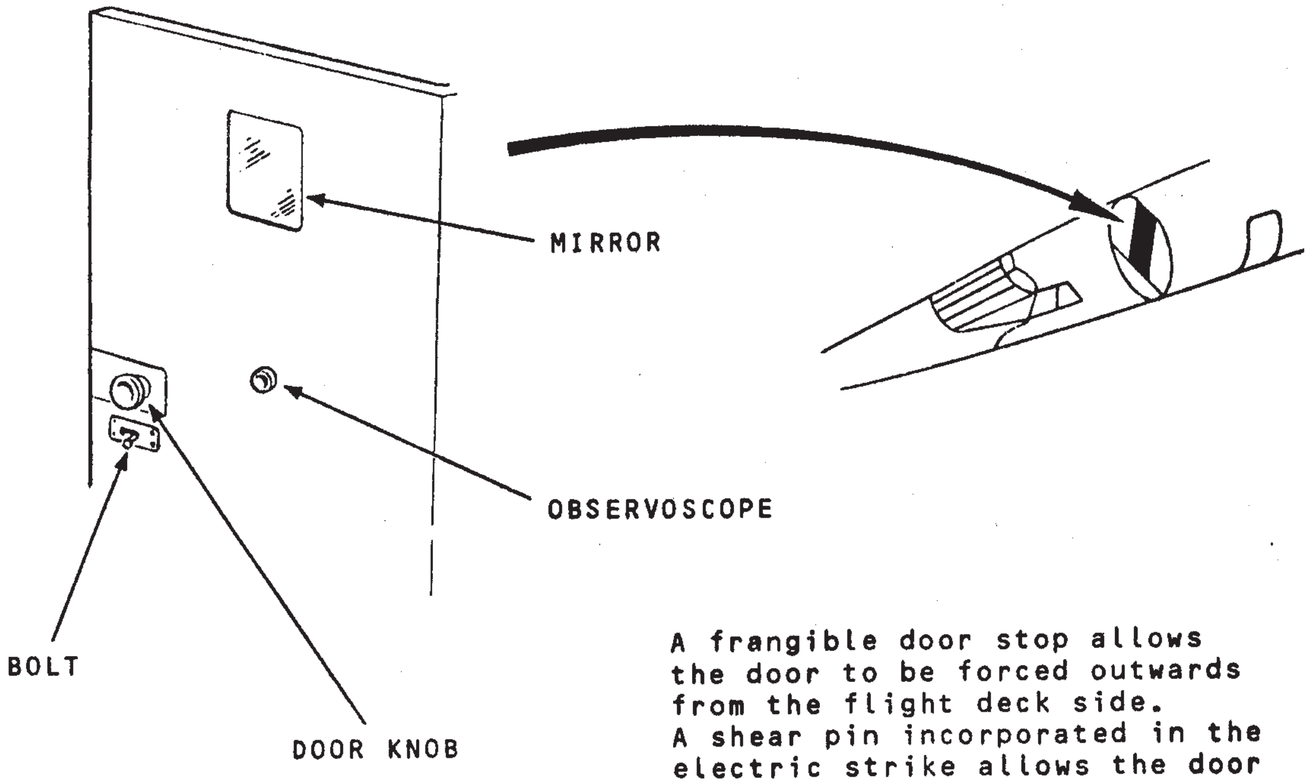
FLIGHT DECK DOOR

FLIGHT DECK DOOR SWITCH

OPEN - the door lock electric strike is de-energized. In this condition the door can be opened from either side without turning the knob or using the key.

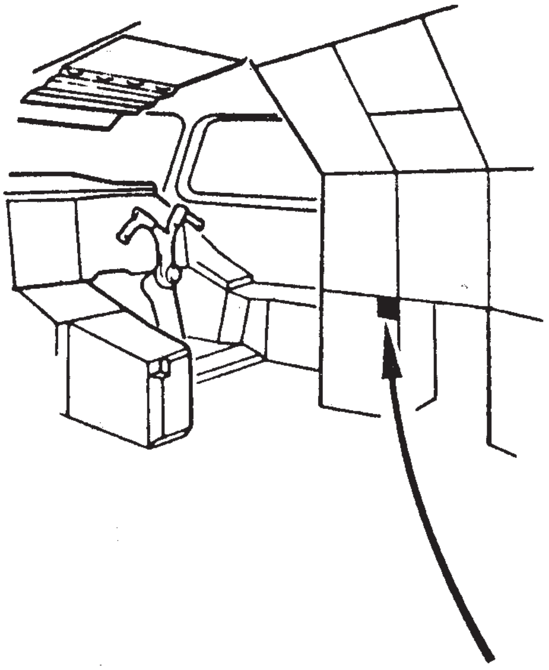
NORMAL - the door lock electric strike is energized. In this condition the door can be opened from the flight deck side by turning the knob and from the cabin side, only by using a key.





A frangible door stop allows the door to be forced outwards from the flight deck side.
A shear pin incorporated in the electric strike allows the door to be forced from the cabin side.
An independent bolt is fitted on the flight deck side.
There is a thumb catch on the flight deck side of the door lock. This should be kept in the locked position.

DOOR WARNING CAPTION LIGHTS

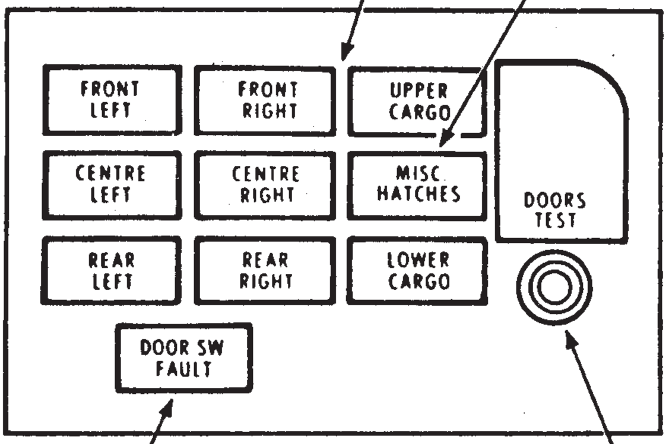


DOOR LIGHTS (Red)

On - indicates that the corresponding door is not locked. Accompanied by a MWS DOOR light (red) and audio (gong).

MISCELLANEOUS HATCHES LIGHT (Red)

On - indicates that servicing hatches are not shut. Accompanied by a MWS DOOR light (red) and audio (gong).



DOOR SWITCH FAULT LIGHT (Yellow) (SIX CABIN DOORS ONLY)

On - indicates that one or more door indication circuits are giving an incorrect indication. Each main door has two switches for indication. If one is sensing open and one sensing shut then a disparate signal is sent.

DOORS TEST PUSH BUTTON

Pressed - tests the door lights and their connection to the master warning system.

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SEATS

GENERAL

Four seats are mounted on rails in the flight compartment; three of the seats, captain, first officer and flight engineer, are electrically operated. The fourth seat which accommodates the first supernumerary crew member is wholly manual in operation. A fifth seat, which is not mounted on rails and has a fixed position at the rear of the other seats, can accommodate a second supernumerary crew member. The disposition of the seat rails provides maximum mobility for the operating crew.

The captain's seat can be tracked aft to allow him access to the seat and to monitor the systems management panel at the flight engineer's station as necessary. The first officer's seat tracks aft and outboard to provide access between the centre console and the seat. Both seats are electrically power operated for tracking and height adjustment with manual reversion if required. In addition the seat pans and seat backs are adjustable for tilt. The arm-rests are adjustable.

The flight engineer's seat can be turned outboard to face the systems management panels or forward for take-off and landing. The floor rails allows the flight engineer to track forward to within easy reach of the centre console and is power operated for fore and aft movement and height adjustment with manual reversion if required. The flight engineer is automatically prevented from selecting crashlock pin disengagement unless the seat is positioned within a band of 2 inches to the right hand side of the aircraft centre line. When not in used the seat can be stowed by tracking it transversely across the trolley into the knee recess in the systems management panels.

To prevent a collision between the flight engineer's and the captains seats when the former is motored forward or the latter rearward an inter-seat strut is positioned on the inboard rail at the rear of the captain's seat. The front end of the strut, is attached to the base structure of the captains seat, the rear end has a projecting striker pad to operate a limit switch on the flight engineer's seat to disarm the relevant circuits of both seats. A foot pedal on the secondary trolley of the flight engineer's seat, when operated, permits the strut to override the micro switch mechanism thus allowing the captain's seat to proceed rearward if unobstructed.

(Deletion)

To prevent injury to the occupant of the first supernumerary seat when the captain's seat is motored rearward a detachable strut is fitted to the first supernumerary's seat. Contact between the two seats is prevented by the front end of the strut tripping a micro switch on the captain's seat breaking the tracking circuit of that seat.

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The first supernumerary crew member's seat is manually operated and is mounted on rails behind the captain's seat. The seat can be moved forward or rearwards and adjusted in height and partly rotated on its base. When not in use the seat pan is stowed by lifting and folding it against the seat back where it is held in position by the safety harness. The latchplate is operated to disengage the detachable strut and the seat is moved rearward to stow at an angle to the aircraft centre line in the rear left hand corner of the flight compartment.

When lowering the seat pan from the stowed position
- depress the seat pan lock control
- ensure that the seat pan moves into a fully lowered position
- release the seat pan lock control
- confirm seat pan locked down.

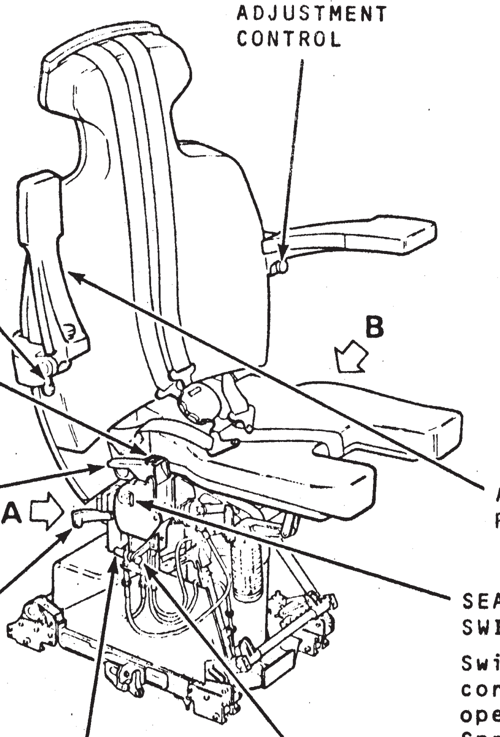
Do not sit on the seat until correct lock engagement is confirmed otherwise damage to the locking mechanism will occur.

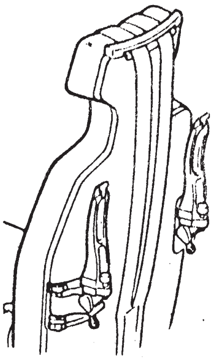
The second supernumerary crew member's seat is stowed flat against the left hand equipment rack, held by a claw arm catch, when not in use. When the catch is released the seat may be swung down, the legs locked into receptacles in the floor and the back raised into position. Operation of a lever mounted on the forward leg frees the legs from the floor. It also releases the back so that it may be placed in position for stowing.

An inertia reel safety harness is fitted to each seat with the exception of the second supernumerary seat. This harness is clasped to a single anchorage point on the floor and three seat anchorage points.

SEATS

PILOT'S SEAT





ARMRESTS STOWED AFT

ARMREST RELEASE LEVER

For use when armrest stowed forward.
Spring loaded to lock armrest in stowed position.
Pressing allows manual adjustment in forward stowed position.

ARMREST FINE ADJUSTMENT CONTROL

FORE AND AFT SWITCHES

Ganged switches operate in the correct sense.
Spring loaded centre off.

ARMREST STOWED FORWARD

CRASHLOCK RELEASE LEVER

Lifting disengages seat crashlock pin.

SEAT HEIGHT CONTROL SWITCHES

Switches operate in the correct sense and must be operated together.
Spring-loaded centre off.

EMERGENCY CRASHLOCK AND MOTOR DRIVE DISCONNECT LEVER

Lifting allows manual adjustment of the seat, fore and aft.

SEAT PAN ADJUSTMENT LOCK LEVER

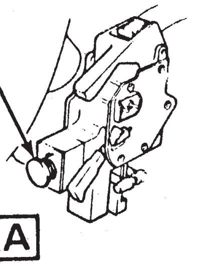
Lifting unlocks seat pan allowing manual adjustment.
Spring-loaded to lock when released.

SEAT BACK ADJUSTMENT LOCK LEVER

Lifting unlocks the seat back allowing manual adjustment.
Spring-loaded to lock when released.

SEAT POWER SWITCH

PULL - power on.
ILLUMINATED - green.
PUSH - power off.
TURN - to vary light intensity.

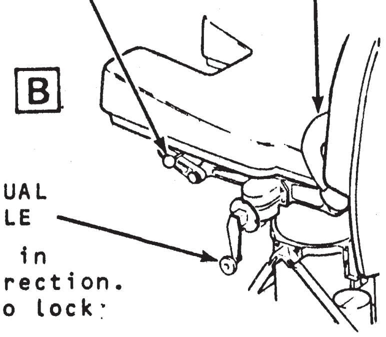


SHOULDER HARNESS INERTIA REEL CONTROL LEVER

FWD - Inertia reel unlocks
Spring return to centre.
CENTRE - Inertia reel allows withdrawal of harness but locks with sudden forward movement.
REAR - Inertia reel locks.

HARNESS LAP STRAPS

Allows straps to retract fully into the reel before removing from the locked position.



SEAT HEIGHT MANUAL ADJUSTMENT HANDLE

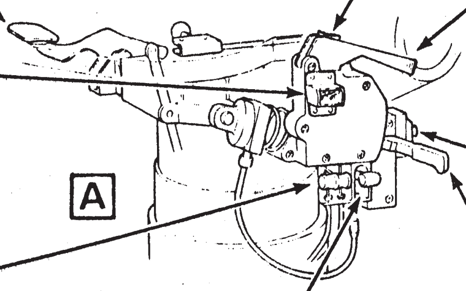
Pull and rotate in the required direction.
Spring loaded to lock when released.

NOTE:
CAPTAIN'S SEAT shown.
FIRST OFFICER'S SEAT

The control console is on the left hand side, and the inertia reel lever and manual seat height adjustment lever is on the right hand side.
Right hand armrest cannot be stowed.

SEATS

FLIGHT ENGINEER'S SEAT



SEAT ROTATION LOCK LEVER

PRESS - to rotate seat through 90° outboard from forward facing position. Spring loaded to lock at 15° intermediate positions.

FORE AND AFT CONTROL SWITCHES

Ganged switches operate in the correct sense. Spring-loaded centre off.

CRASHLOCK RELEASE LEVER

Lifting disengages seat crashlock pins.

SEAT HEIGHT CONTROL SWITCHES

Switches operate in the correct sense and must be operated together. Spring-loaded centre off.

SEAT POWER SWITCH

PULL - power on.
ILLUMINATED - green.
PUSH - power off.
TURN - to vary light intensity.

TRANSVERSE TRAVEL LOCK LEVER

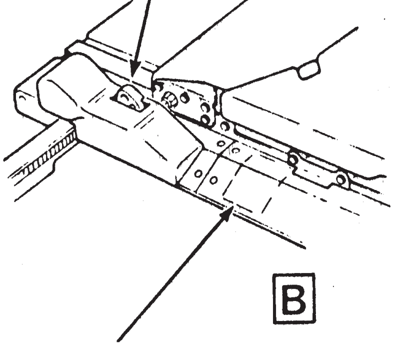
Lifting removes the lock to allow transverse travel. Release to lock in any one of seven positions.

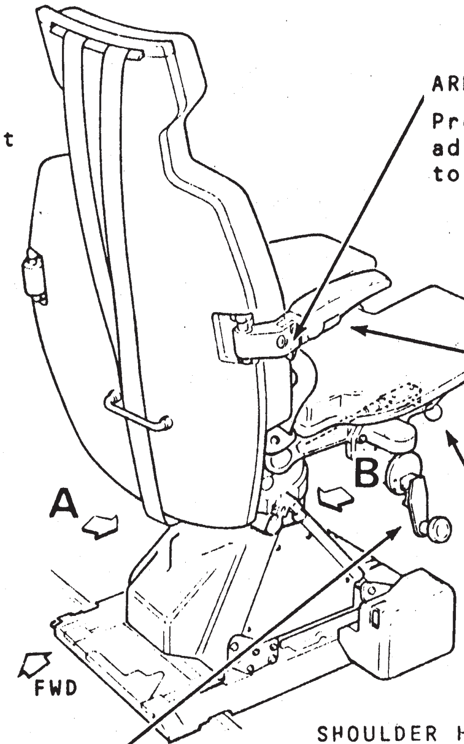
SEAT BACK ADJUSTMENT LOCK LEVER

Lifting unlocks the seat back allowing manual adjustment. Spring loaded to lock when released.

EMERGENCY CRASHLOCK AND MOTOR DRIVE DISCONNECT LEVER

Lifting allows manual adjustment of the seat fore and aft.





FOOT OPERATED PEDAL

Allows rearward movement of Captain's seat past Flight Engineer's seat. Spring loaded to return.

ARMREST RELEASE LEVER

Pressing allows manual adjustment. Spring loaded to lock when released.

ARMREST FINE ADJUSTMENT CONTROL

Crashlock pin disengagement band.

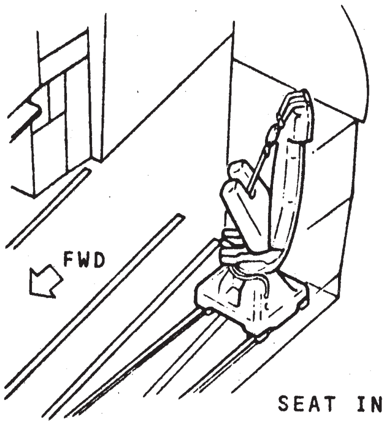
SHOULDER HARNESS INERTIA REEL CONTROL LEVER

FWD - Inertia reel unlocks Spring return to centre.
CENTRE - Inertia reel allows withdrawal of harness but locks with sudden forward movement.
REAR - Inertia reel locks.

SEAT HEIGHT MANUAL ADJUSTMENT HANDLE

Pull and rotate in the required direction. Spring loaded to lock when released.

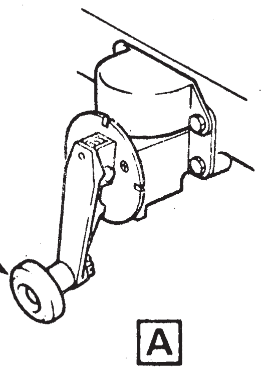
FIRST SUPERNUMERARY'S SEAT



SEAT IN STOWED POSITION

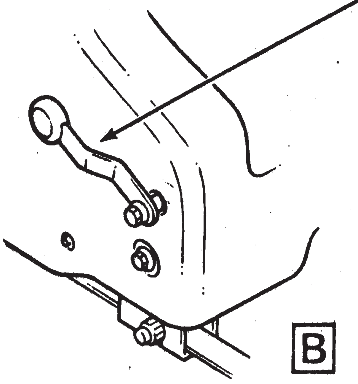
SEAT HEIGHT ADJUSTMENT HANDLE

Pull out from detent and rotate in the required direction. Spring-loaded to lock when released.



FORE AND AFT LEVER

Allows movement of seat by Flight Engineer.

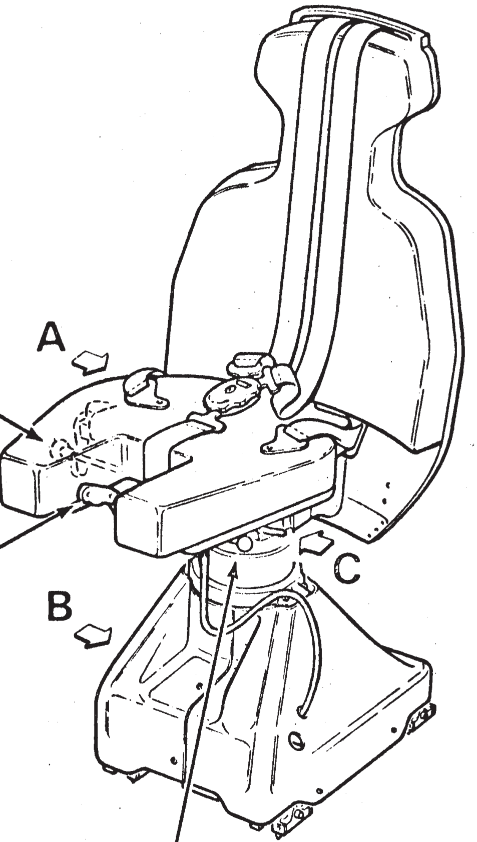


SEATPAN LOCK CONTROL

Press - to release.
Press - to re-engage lock.

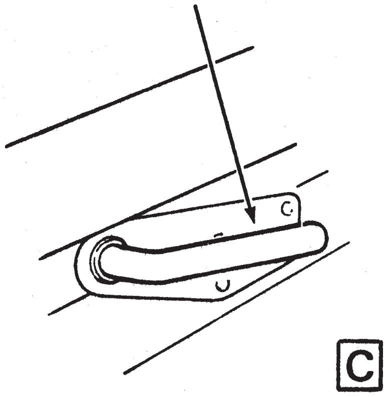
CRASHLOCK RELEASE LEVER

Lifting disengages seat crashlock pins.



SEAT ROTATION CATCH LEVER

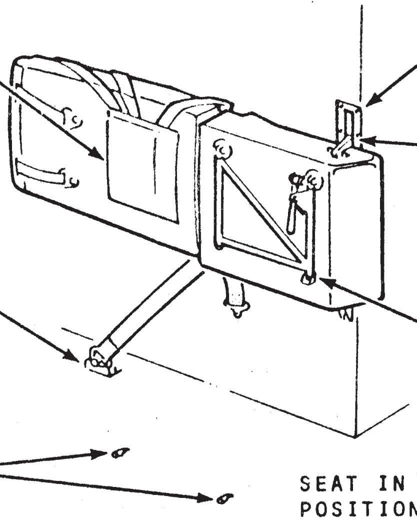
Lifting allows seat to rotate inboard to an angle 41 degrees to the aircraft centre line for stowage.



SHOULDER HARNESS INERTIA REEL CONTROL LEVER

FWD -	Inertia reel unlocks. Spring return to centre.
CENTRE -	Inertia reel allows withdrawal of harness but locks with sudden forward movement.
REAR -	Inertia reel locks.

SECOND SUPERNUMERARY'S SEAT



HARNESS STOWAGE POCKET

Gather the loose harness and place in the stowage pocket when the seat is stowed.

SEAT STOWAGE CATCH

Press catch to raise claw arm to release seat from stowed position.

CLAW ARM

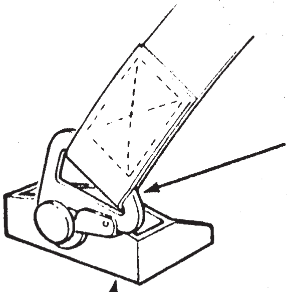
Engages with locking hook on seat.

HARNESS FLOOR ANCHORAGE

SEAT LEG STOWAGE BRACKET

SEAT LEG RECEPTACLES

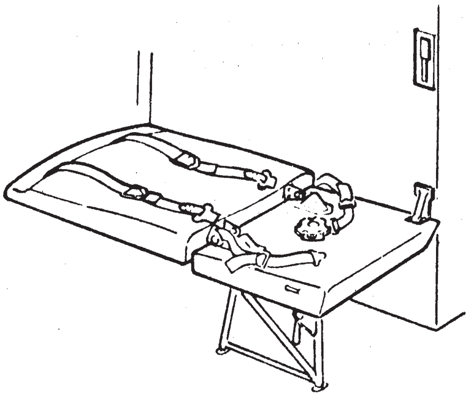
SEAT IN STOWED POSITION



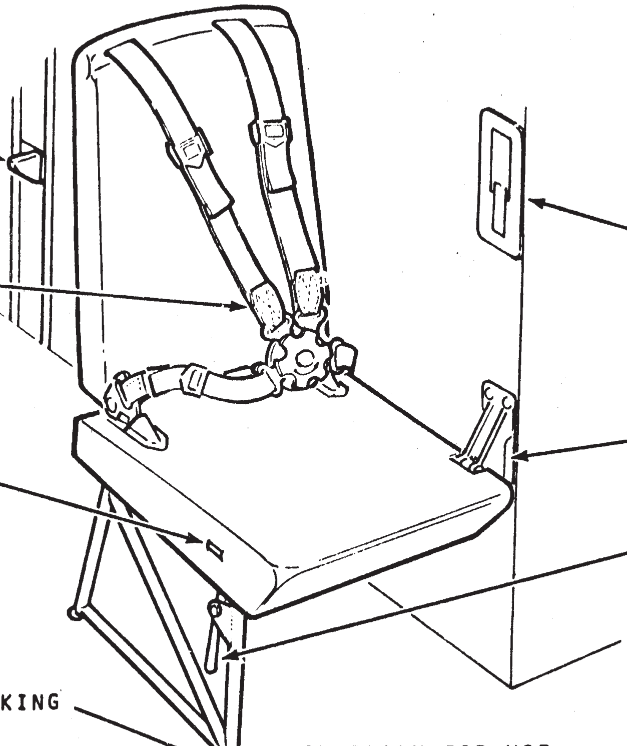
QUICK RELEASE HARNESS ATTACHMENT PLATE

Three attachments on seat, one on floor.

HARNESS FLOOR ANCHORAGE



SEAT IN POSITION FOR FLIGHT COMPARTMENT ACCESS



SEAT BACK REST

SEAT STOWAGE CATCH

Press to raise claw arm, to engage it with seat locking hook, when stowing seat.

SAFETY HARNESS

SEAT HINGE PIVOT ATTACHMENT

LOCKING HOOK

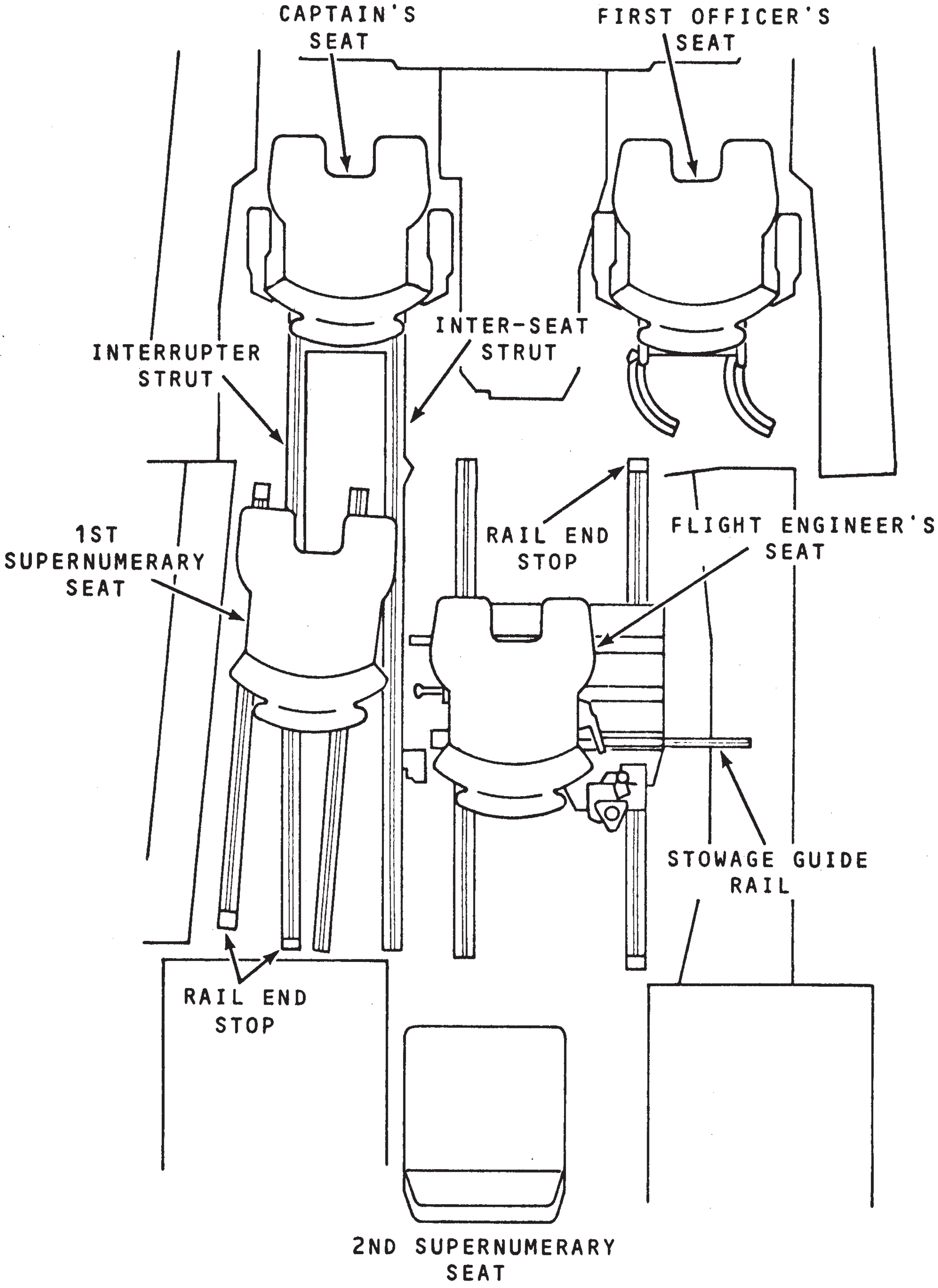
SEAT BACK AND LEG RELEASE LEVER

Support seat back with left hand, grasp forward leg and lever with right hand and squeeze lever towards leg to release seat back and leg locking plunger.

LEG LOCKING PLUNGER

SEAT READY FOR USE

SEATS AND RAILS



LIGHTS

DESCRIPTION

Internal lighting is by a mixture of fluorescent, electro-luminescent, instrument integral, spot and flood.

GENERAL ILLUMINATION

Two fluorescent lights are fitted for illumination in the racking area, they are controlled by two-way switching at the forward end of the circuit breaker panels and the cabin crew forward control panel.

Two spotlights are fitted as boarding lights in the forward vestibule.

One fluorescent light in the roof illuminates the flight compartment.

CREW MEMBERS' STATIONS

Each crew member has independent control of his panel and general lighting.

STORM

The STORM lighting is high intensity fluorescent lighting in combination with a high intensity roof mounted floodlight which illuminates the dash panels to overcome the effects of glare through the windshields.

EXTERNAL LIGHTING

One anti-collision light is situated in each wing root leading edge and one is situated at the end of the tailcone. The three lights flash simultaneously.

The taxi-turn lights are situated on the left and right side of the front fuselage.

The landing taxi lights are situated on the right hand and left hand nose gear doors. A landing taxi light will not illuminate until it has left the retracted position even if the lamp is switched on. On the ground, a nose gear switch circuit ensures that a 400 W filament is operated. When airborne, a 600 W filament is operated and the lamp angle is depressed to compensate for the approach attitude.

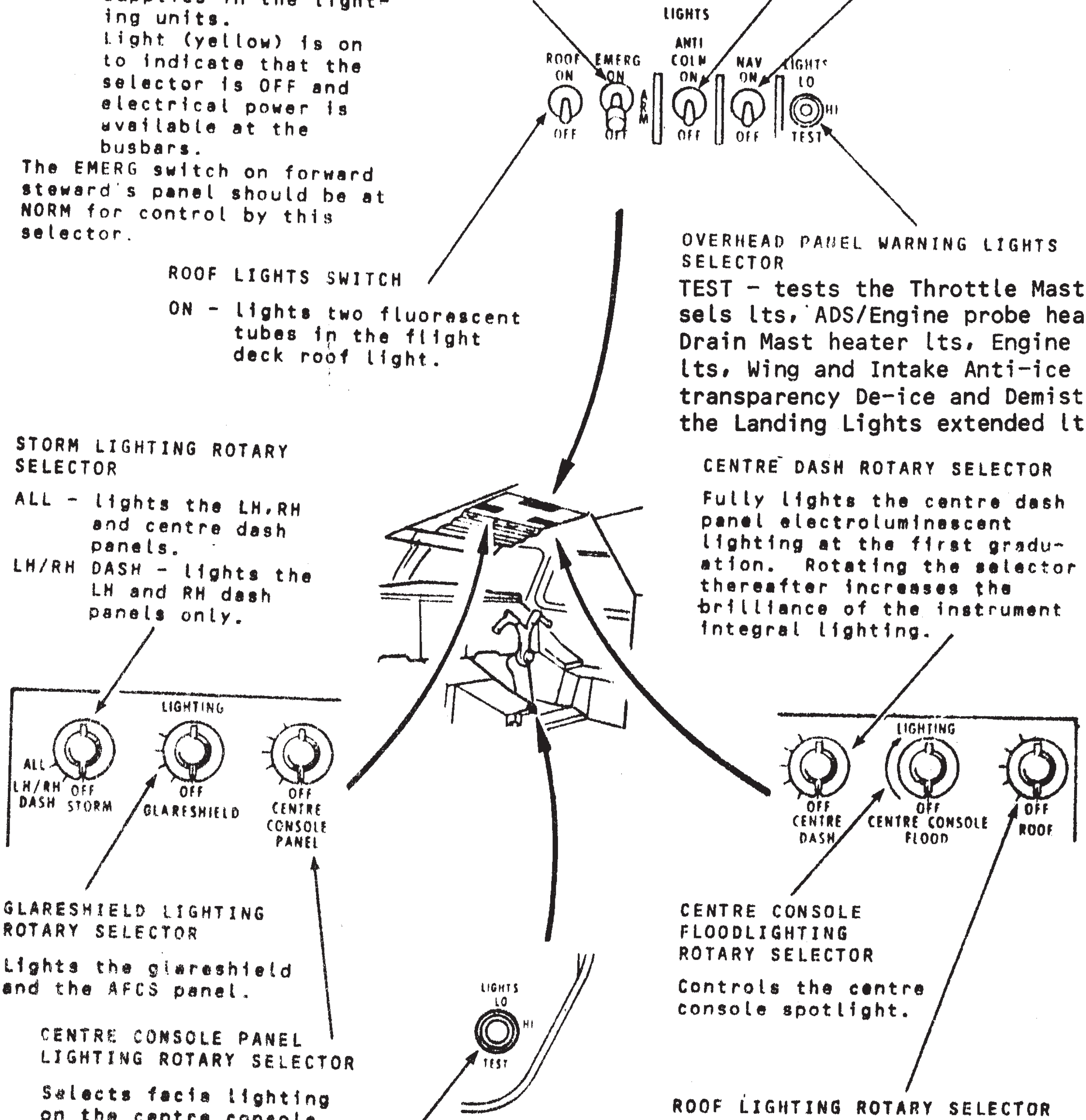
(Unchanged)

The main landing lights are situated in the right and left wing leading edge roots. A main landing light will not illuminate until it has left its retracted position even if the lamp is switched on. Automatic blowback occurs at 365 knots.

The navigation lights are situated one in the outer leading edge of each wing and one in the tailcone.

PILOTS' FLIGHT DECK LIGHTING CONTROLS

(Sheet 1 of 2)



EMERGENCY LIGHTS SELECTOR AND LIGHT (Yellow)

ON - test facility.

ARM - all aircraft emergency lights will come on in the event of a failure of the d.c. essential A busbar.

OFF - isolates the battery supplies in the lighting units. Light (yellow) is on to indicate that the selector is OFF and electrical power is available at the busbars.

The EMERG switch on forward steward's panel should be at NORM for control by this selector.

ROOF LIGHTS SWITCH

ON - lights two fluorescent tubes in the flight deck roof light.

STORM LIGHTING ROTARY SELECTOR

ALL - lights the LH, RH and centre dash panels.

LH/RH DASH - lights the LH and RH dash panels only.

GLARESHIELD LIGHTING ROTARY SELECTOR

Lights the glareshield and the AFCS panel.

CENTRE CONSOLE PANEL LIGHTING ROTARY SELECTOR

Selects facia lighting on the centre console panel.

LIGHTS SELECTOR

TEST - tests all warning lights on the centre dash panel.

ANTI COLLISION LIGHTS SWITCH

NAVIGATION LIGHTS SWITCH

OVERHEAD PANEL WARNING LIGHTS SELECTOR

TEST - tests the Throttle Master sels lts, ADS/Engine probe heater lts. Drain Mast heater lts, Engine Anti-ice lts, Wing and Intake Anti-ice lts, transparency De-ice and Demist lts and the Landing Lights extended lts.

CENTRE DASH ROTARY SELECTOR

Fully lights the centre dash panel electroluminescent lighting at the first graduation. Rotating the selector thereafter increases the brilliance of the instrument integral lighting.

CENTRE CONSOLE FLOODLIGHTING ROTARY SELECTOR

Controls the centre console spotlight.

ROOF LIGHTING ROTARY SELECTOR

Fully lights the roof panel electroluminescent lighting at the first graduation. Rotating the selector thereafter increases the brilliance of the instrument integral lighting.

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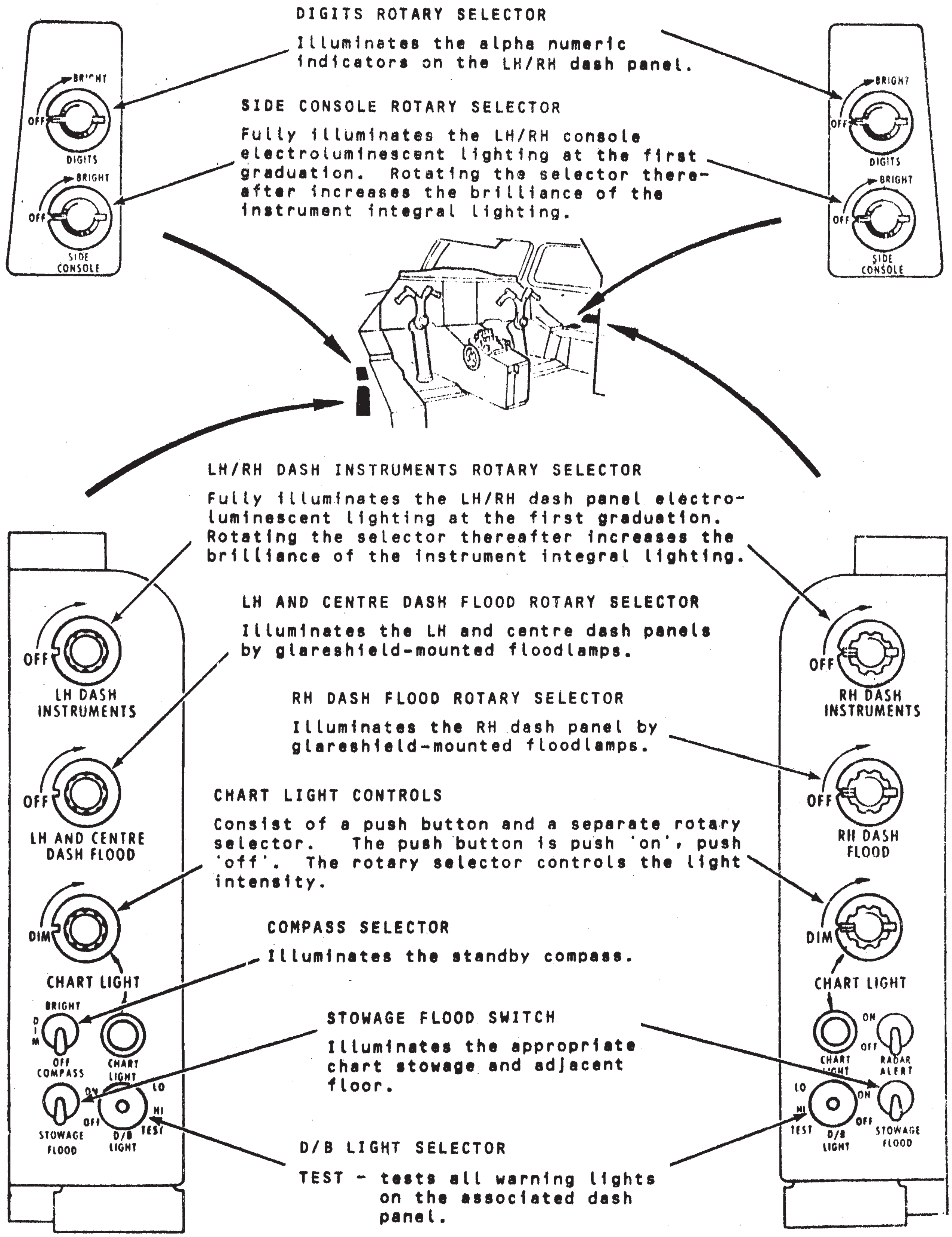
PILOTS' FLIGHT DECK LIGHTING CONTROLS

(Sheet 2 of 2)



DIGITS ROTARY SELECTOR

Illuminates the alpha numeric indicators on the LH/RH dash panel.

SIDE CONSOLE ROTARY SELECTOR

Fully illuminates the LH/RH console electroluminescent lighting at the first graduation. Rotating the selector thereafter increases the brilliance of the instrument integral lighting.

LH/RH DASH INSTRUMENTS ROTARY SELECTOR

Fully illuminates the LH/RH dash panel electroluminescent lighting at the first graduation. Rotating the selector thereafter increases the brilliance of the instrument integral lighting.

LH AND CENTRE DASH FLOOD ROTARY SELECTOR

Illuminates the LH and centre dash panels by glareshield-mounted floodlamps.

RH DASH FLOOD ROTARY SELECTOR

Illuminates the RH dash panel by glareshield-mounted floodlamps.

CHART LIGHT CONTROLS

Consist of a push button and a separate rotary selector. The push button is push 'on', push 'off'. The rotary selector controls the light intensity.

COMPASS SELECTOR

Illuminates the standby compass.

STOWAGE FLOOD SWITCH

Illuminates the appropriate chart stowage and adjacent floor.

D/B LIGHT SELECTOR

TEST - tests all warning lights on the associated dash panel.

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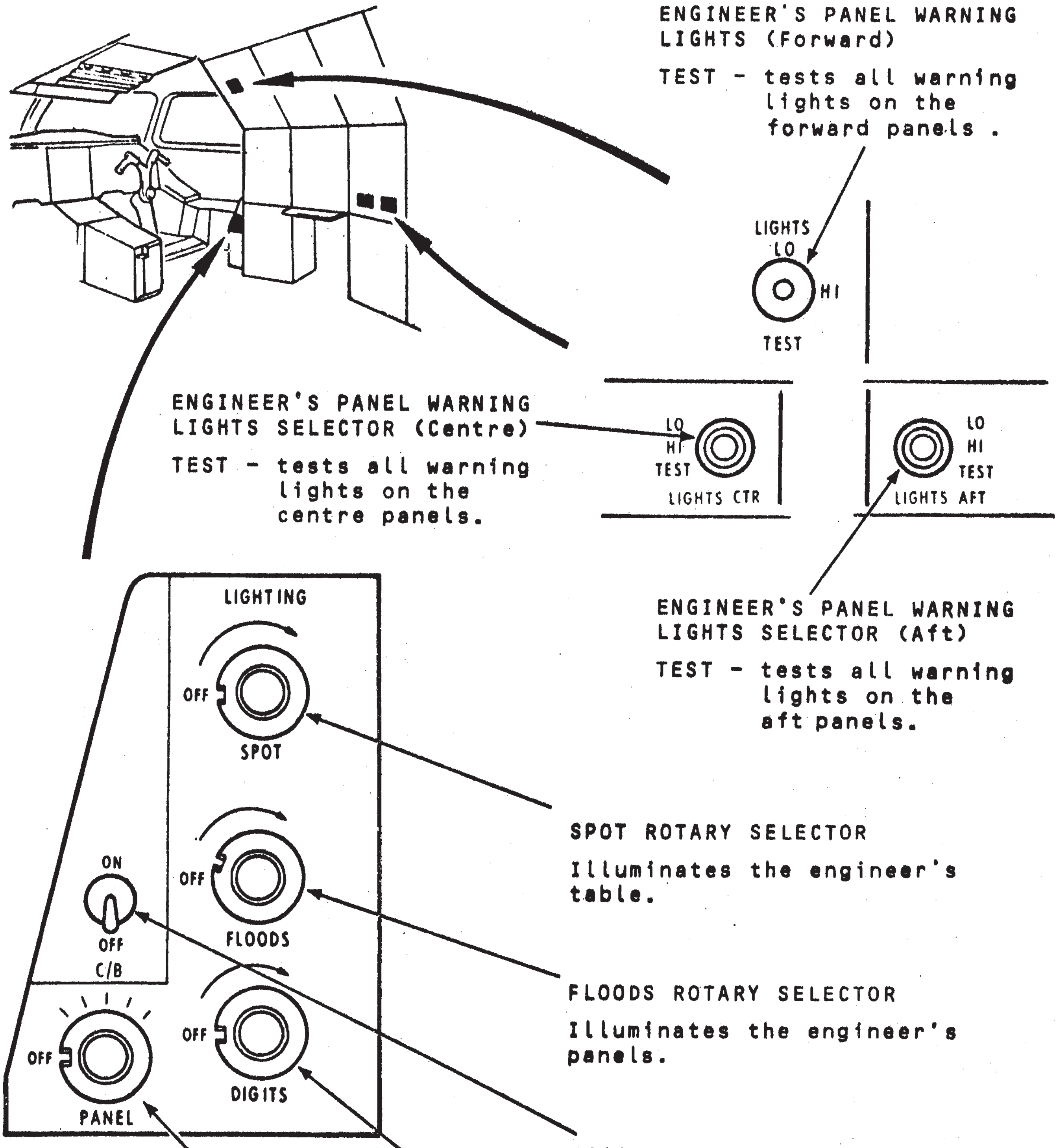
FLIGHT ENGINEERS' LIGHTING CONTROLS



ENGINEER'S PANEL WARNING LIGHTS (Forward)

TEST - tests all warning lights on the forward panels .

ENGINEER'S PANEL WARNING LIGHTS SELECTOR (Centre)

TEST - tests all warning lights on the centre panels.

ENGINEER'S PANEL WARNING LIGHTS SELECTOR (Aft)

TEST - tests all warning lights on the aft panels.

SPOT ROTARY SELECTOR

Illuminates the engineer's table.

FLOODS ROTARY SELECTOR

Illuminates the engineer's panels.

CIRCUIT BREAKER SWITCH

Illuminates the circuit breaker panels on the flight deck.

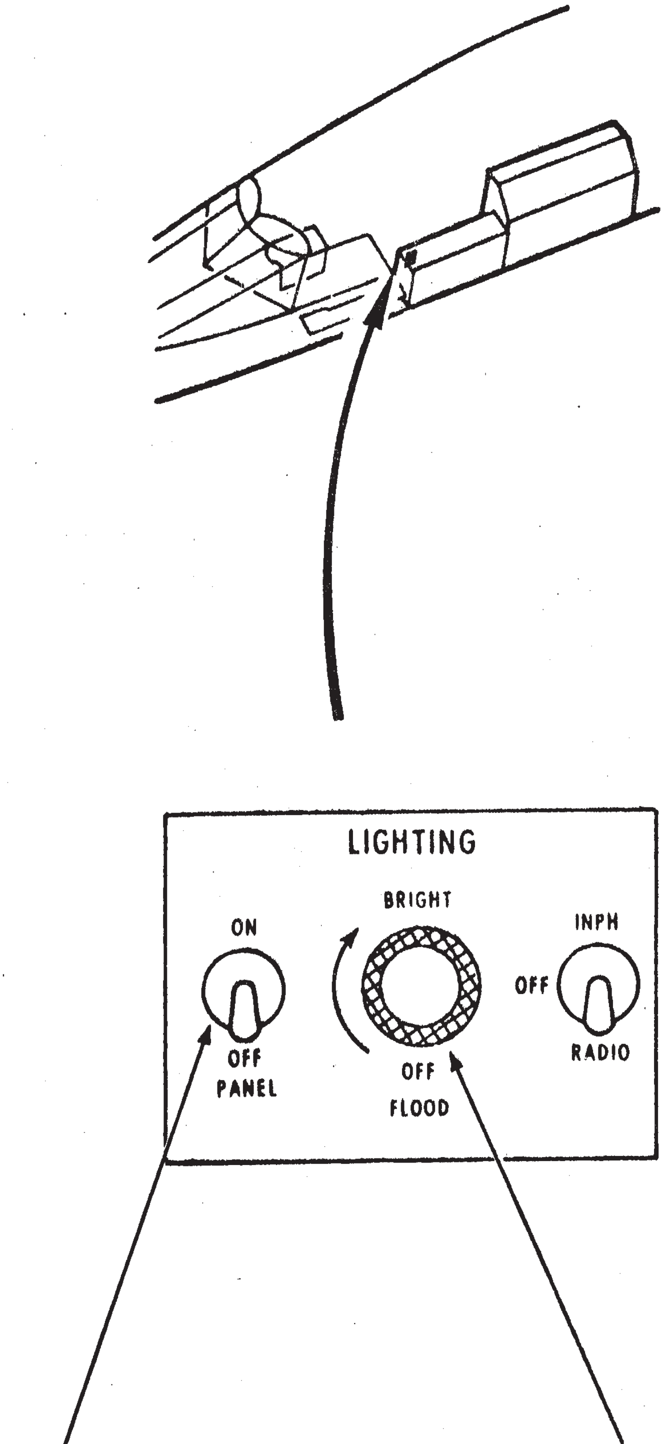
PANEL ROTARY SELECTOR

Illuminates the engineer's panel electroluminescent lighting. Rotating the selector increases the brilliance of the integral lighting.

DIGITS ROTARY SELECTORY

Illuminates the alpha numeric indicators on the fuel panel.

FIRST AND SECOND SUPERNUMERARY LIGHTING CONTROLS



FLOOD ROTARY SELECTOR

Illuminates the first supernumerary's station

PANEL SWITCH

ON - selects electroluminescent lighting on the first supernumerary's panel, plus integral lights for the first supernumerary's station box and jack box, also the integral lights for the second supernumerary's jack box.

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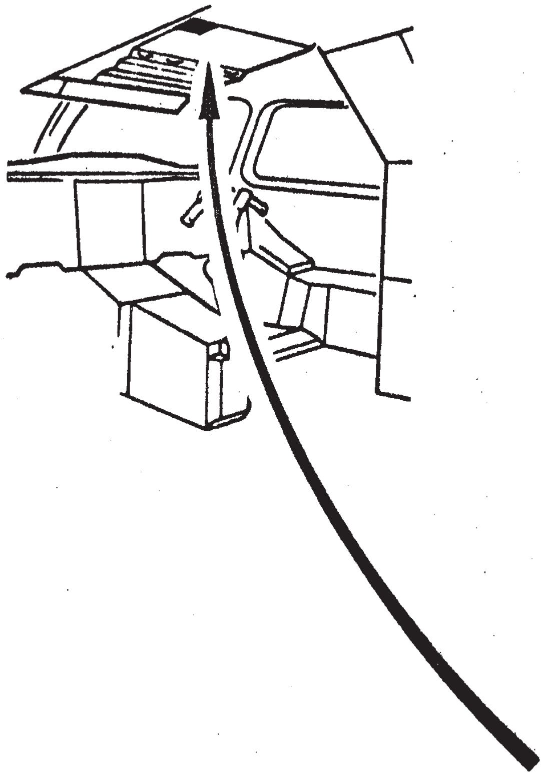
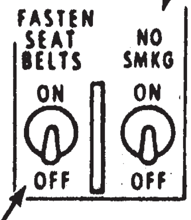
PASSENGER WARNING SIGN CONTROLS



NO SMKG SWITCH

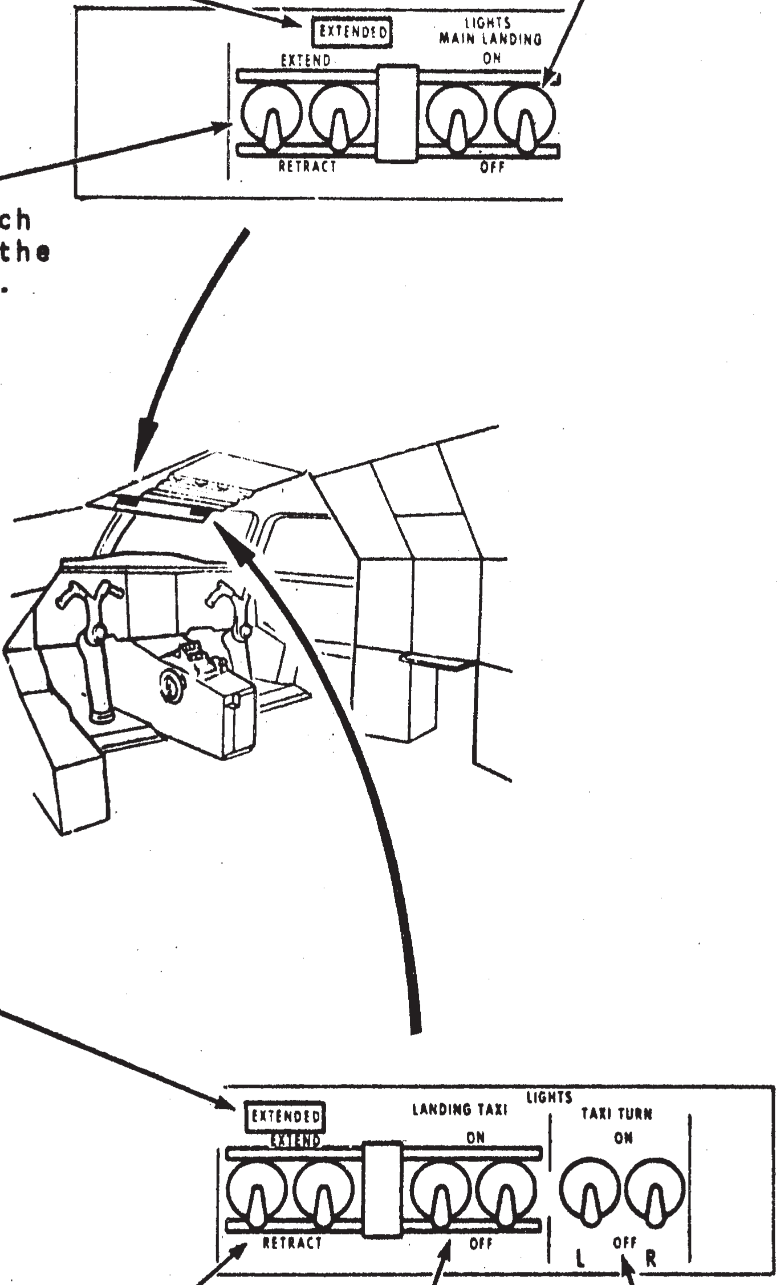
ON - lights the NO SMOKING signs in the passenger cabin, the NO SMOKING lights (amber) on each stewards panel, the cabin EXIT signs and switches on the standby lighting in the passenger cabin, vestibule, galley and toilets. Accompanied by an audio tone on the public address.



FASTEN SEAT BELTS SWITCH

ON - lights the FASTEN SEAT BELTS signs in the passenger cabin, the FASTEN SEAT BELTS lights (amber) on each stewards panel and the RETURN TO SEATS lights in the toilets. Accompanied by an audio tone on the public address.

EXTERNAL LIGHTING CONTROLS



MAIN LANDING LIGHTS SWITCHES

EXTENDED LIGHT (Blue)

On - at least one light is not fully retracted.

MAIN LANDING LIGHTS RETRACT/EXTEND SWITCHES

EXTEND - a motor drives each landing light to the extended position.

EXTENDED LIGHT (Blue)

On - at least one light is not fully retracted.

LANDING TAXI LIGHTS SWITCHES

TAXI TURN LIGHTS SWITCHES

LANDING TAXI LIGHTS RETRACT/EXTEND SWITCHES

EXTEND - a motor drives each landing taxi light to the extended position.

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Chapter 2

AIR CONDITIONING & PRESSURIZATION

AIR CONDITIONING AND PRESSURISATION

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AIR CONDITIONING AND PRESSURIZATION

GENERAL

The air conditioning system consists of four independent groups. The groups take high pressure air from the engines and condition it by cooling, heating and dehumidification. The air is then used to pressurize the pressurised areas and for cooling and ventilation of the equipment racks.

AIR BLEED

Each air conditioning group is supplied from an engine high pressure compressor through a bleed valve which comprises a shut-off valve and a pressure reducing valve. The shut-off valve allows air direct from the source to the pressure reducing valve which limits the supply pressure to 65 psi.

Four cross-bleed valves, downstream of the bleed valves, allow cross feeding between two adjacent supplies on each side of the aircraft. Each cross-bleed valve also permits the ground supply of air from a high pressure ground start truck for air conditioning purposes.

AIR CONDITIONING

An air conditioning valve downstream of the cross-bleed valve controls the entry of bleed air into the air conditioning system.

The bleed air is cooled in a primary heat exchanger then, after passing through the cold air unit compressor, by a secondary heat exchanger and a fuel/air heat exchanger.

The primary and secondary heat exchanger cooling air is taken from an air intake, located on the engine nacelle, at low speeds and, from a bleed inside the air intake, at high speeds, Two jet pumps supplement the ram air flow through the primary and secondary heat exchangers when the landing gear is down.

Upstream from each primary heat exchanger a ram air valve regulates the ram air inlet flow to maintain the air temperature, upstream of the cold air unit, greater than 100 degrees C when the ram air inlet is below 25 degrees C. The fuel/air heat exchangers provide additional air cooling in supersonic flight.

An overheat condition in the primary heat exchanger, in the secondary heat exchanger, in the duct downstream of the fuel/air heat exchanger or in the duct downstream of the cold air unit, will close and latch the conditioning valve.

An overpressure condition downstream of the bleed valve will close and latch the bleed valve.

AIR CONDITIONING AND PRESSURIZATION

A high differential pressure between the cold air unit and the pressurized cabin will close and latch the conditioning valve.

Pre-conditioned air can be supplied through an external ground air supply connection located at the rear of the fuselage. The air is supplied directly to the distribution manifold.

TEMPERATURE CONTROL

The four air conditioning groups supply air to a manifold which distributes the air to the flight deck and the cabin. The manifold shape is such that with all four groups operating normally:

- group 1 supplies the flight deck
- group 2 supplies the forward cabin
- group 3) supplies the rear cabin
- group 4)

Temperature control is normally automatic through group temperature selectors. Normally:

- group 1 selector controls the flight deck
- group 2 selector controls the forward cabin
- group 4 selector controls the rear cabin

A standby temperature control permits a semi-automatic control of the temperature of each group.

PRESSURE CONTROL

Cabin pressure is controlled and maintained by using discharge valves and a ground pressure relief valve to control the outflow of conditioned air from the pressurized zones. Cabin pressure control includes two identical systems SYS 1 and SYS 2. There are two discharge valves, one forward and one aft for each system. Both systems are automatic and operate to the requirements selected on the cabin altitude selector, throttle settings and weight switches. Limited manual control of the pressurization is provided on each system. This permits the direct selection of either of the discharge valves to shut.

The cabin differential pressure is limited to 10.7 psi by the amplifier of the selected system and to 11.2 psi by the cabin pressure limiter of each discharge valve.

The cabin altitude is limited to 11,000 ft by a cabin altitude limiter on each discharge valve and to 15,000 ft by the discharge valve geometry when all four air conditioning groups are operating.

Provision is made for rapid dumping of cabin pressure within the range of the cabin altitude limiters.

A thrust recuperator is fitted to SYS 1 forward discharge valve; it is controlled by differential pressure.

EQUIPMENT BAY COOLING

Two fans extract air from the cabin and exhaust into the forward racks.

Three fans extract air from the forward electronic racks, instrument panels, consoles, weather radar, TRU and INS crates and exhaust the air through the operating forward discharge valve.

Two main fans, and a standby fan in case of failure, extract air from the rear racks and exhaust the air underfloor to the aft discharge valve region.

A non-return valve allows extraction of air from the underfloor region into the extract ducting, then to the forward discharge valves.

A forward emergency relief valve is provided to ensure extraction of air in abnormal conditions.

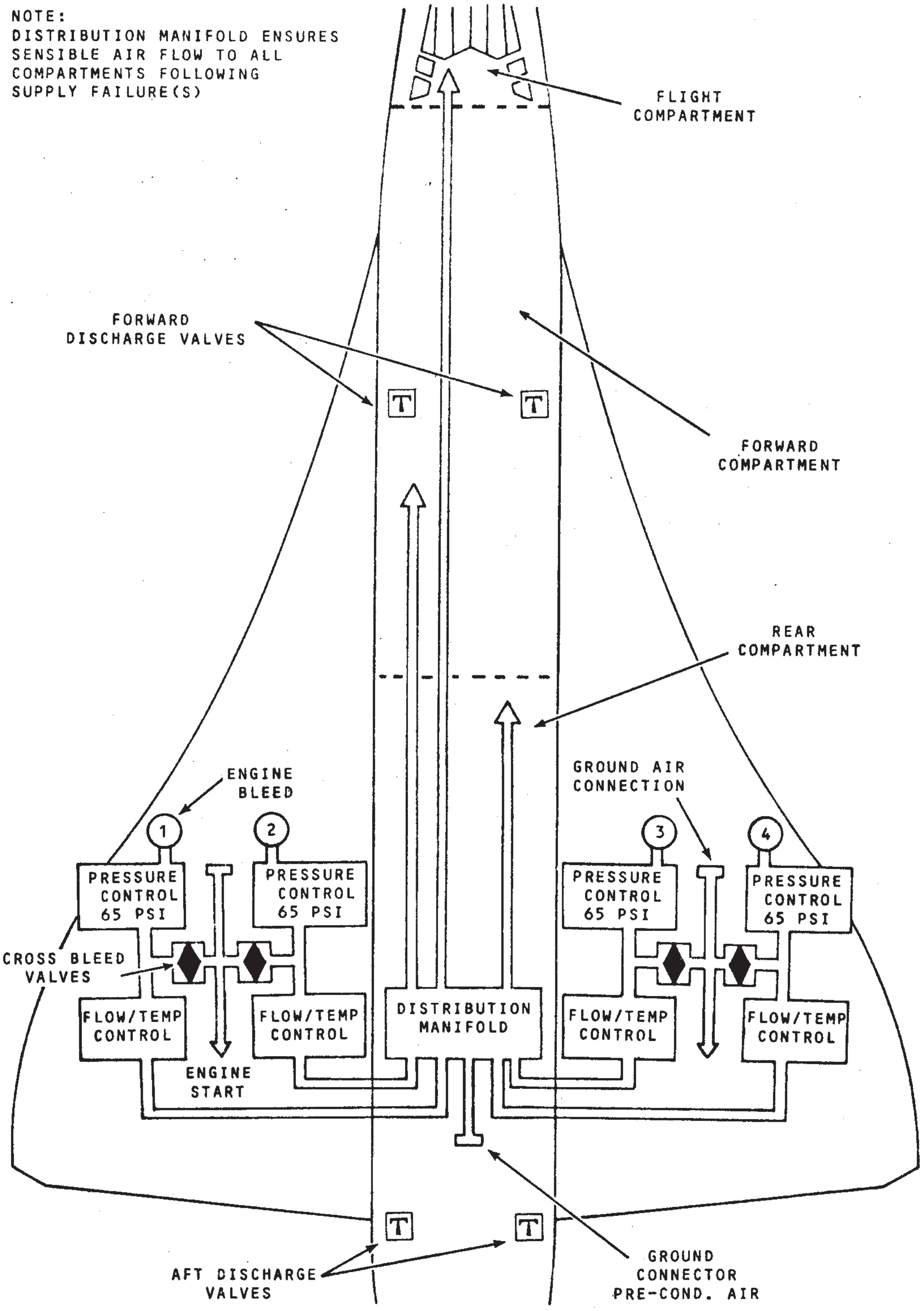
VENTILATION

The main landing gear bay and flying control chassis bay are ventilated, using conditioned air from the cabin.

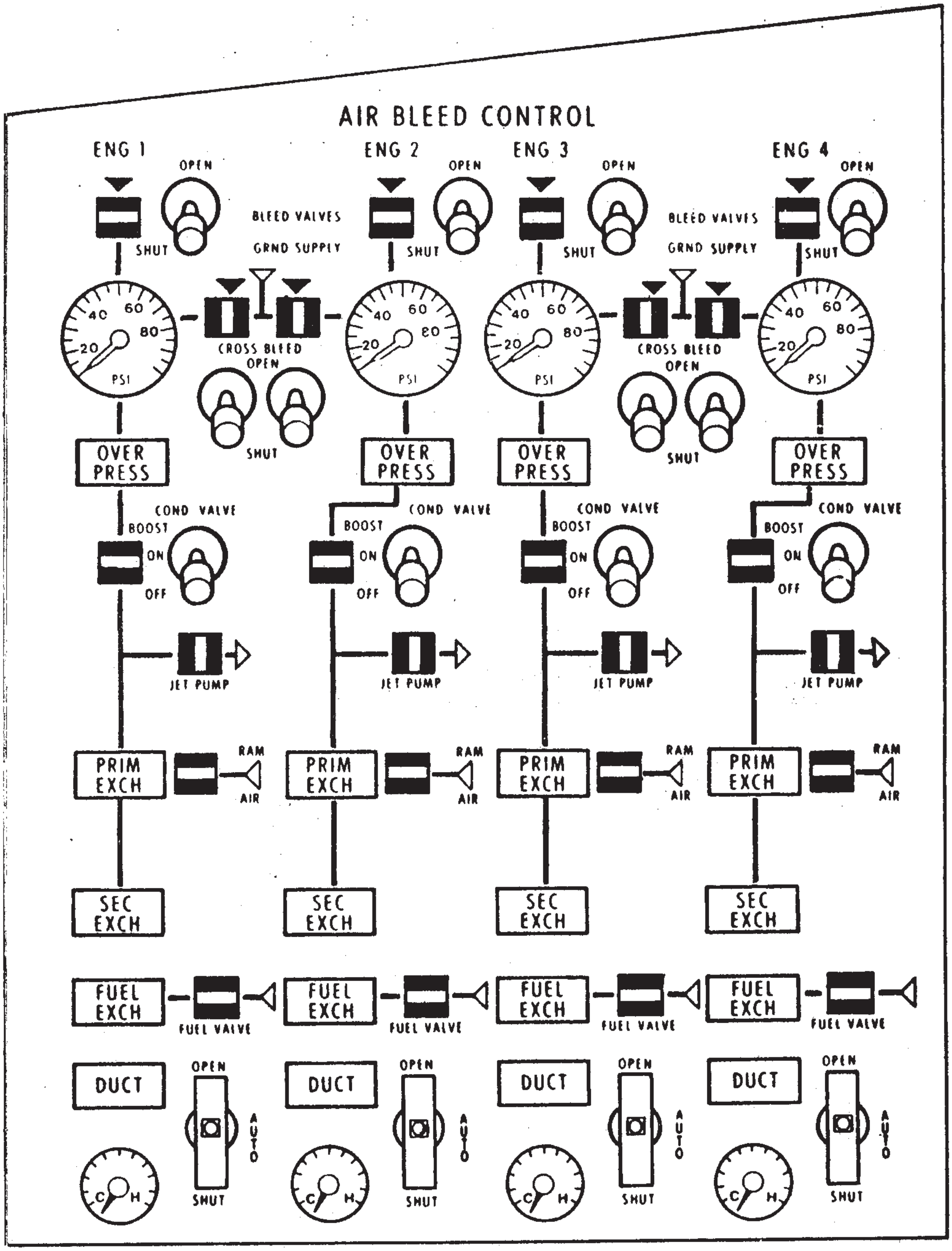
The main landing gear bay is cooled by air bled from the cabin underfloor area. The hydraulic (flying control chassis bay) ventilation valve is controlled by a barometric pressure switch.

The hydraulic bay at the rear of the aircraft is normally ventilated, using air bled from the cabin. The ventilation is assisted by a fan, drawing air from outside the aircraft when the cabin differential pressure is low.

GA OF AIR CONDITIONING AND PRESSURIZATION

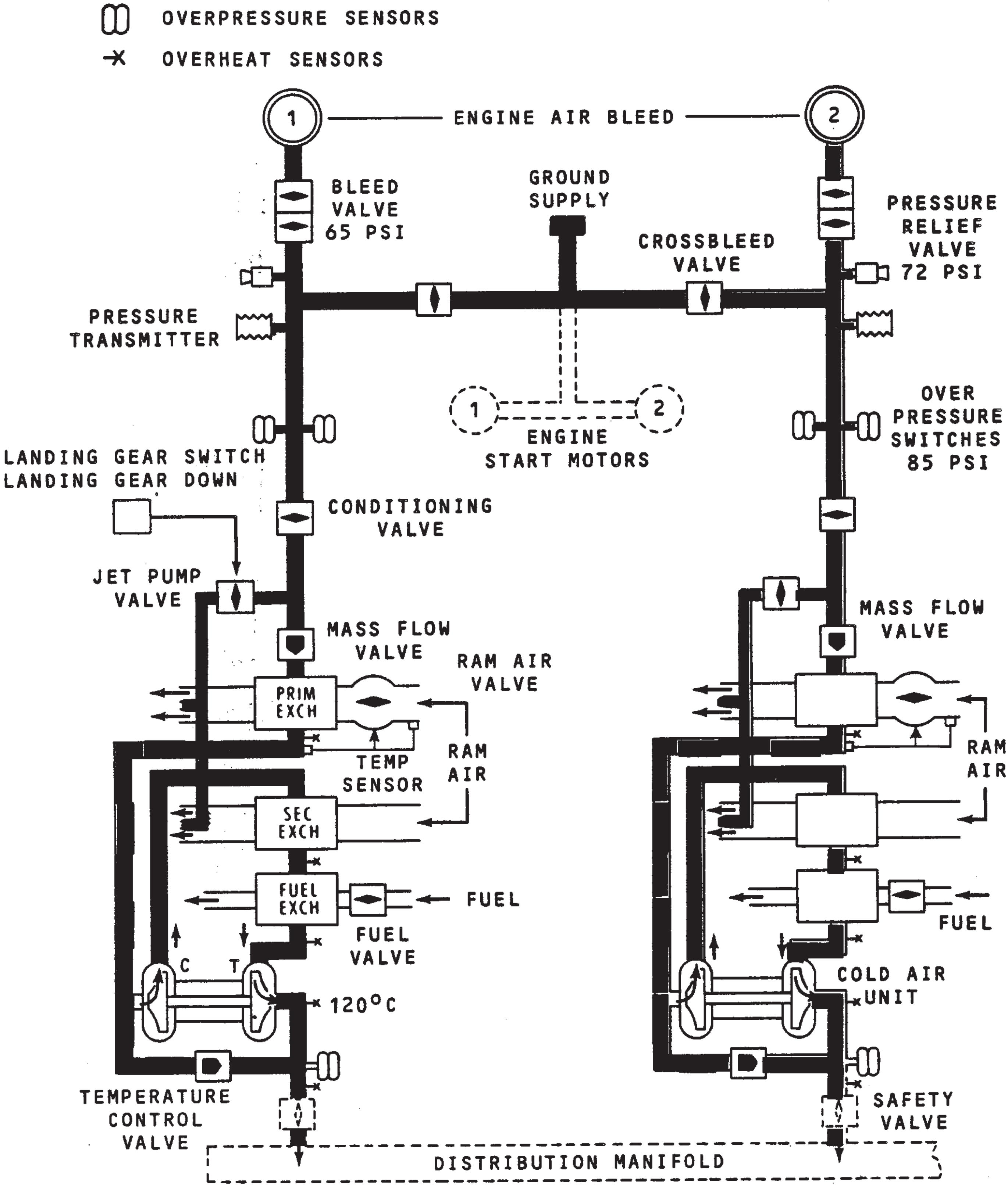


AIR BLEED CONTROL AND INDICATION (SHEET 1 of 2)

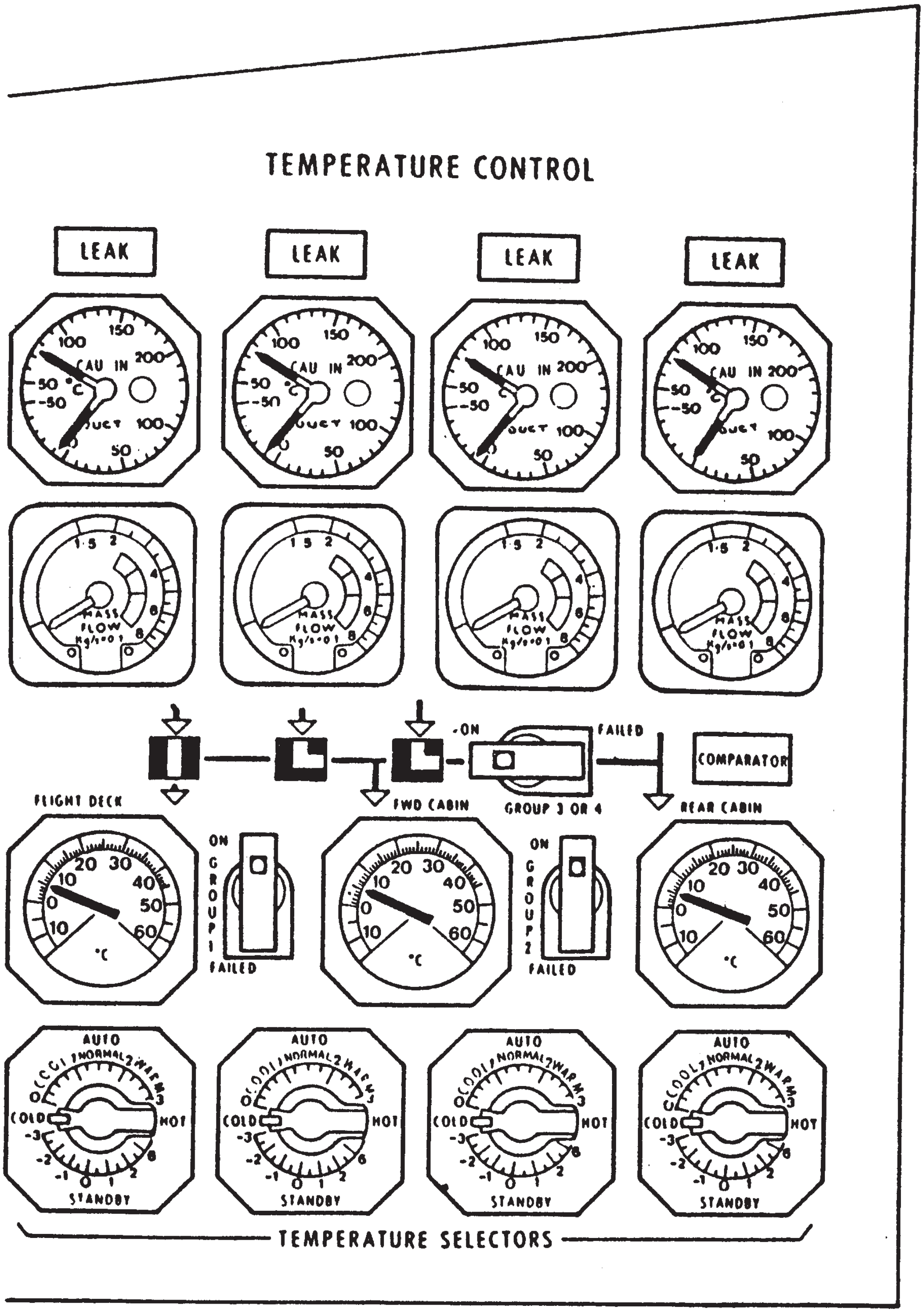


AIR BLEED CONTROL AND INDICATION (SHEET 2 OF 2)

NOTE: GROUPS 3 AND 4 SIMILAR



TEMPERATURE CONTROL AND INDICATION (SHEET 1 OF 2)



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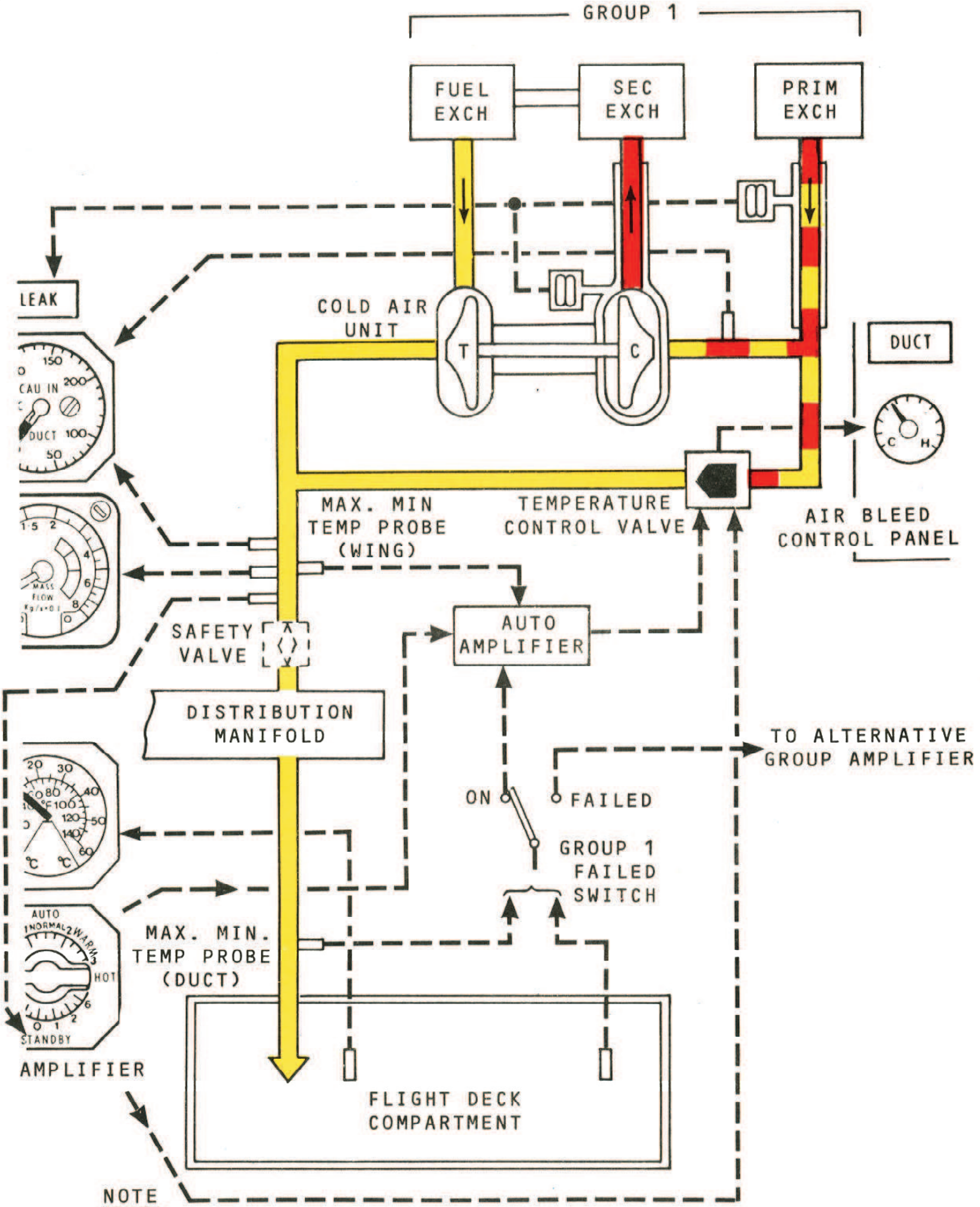
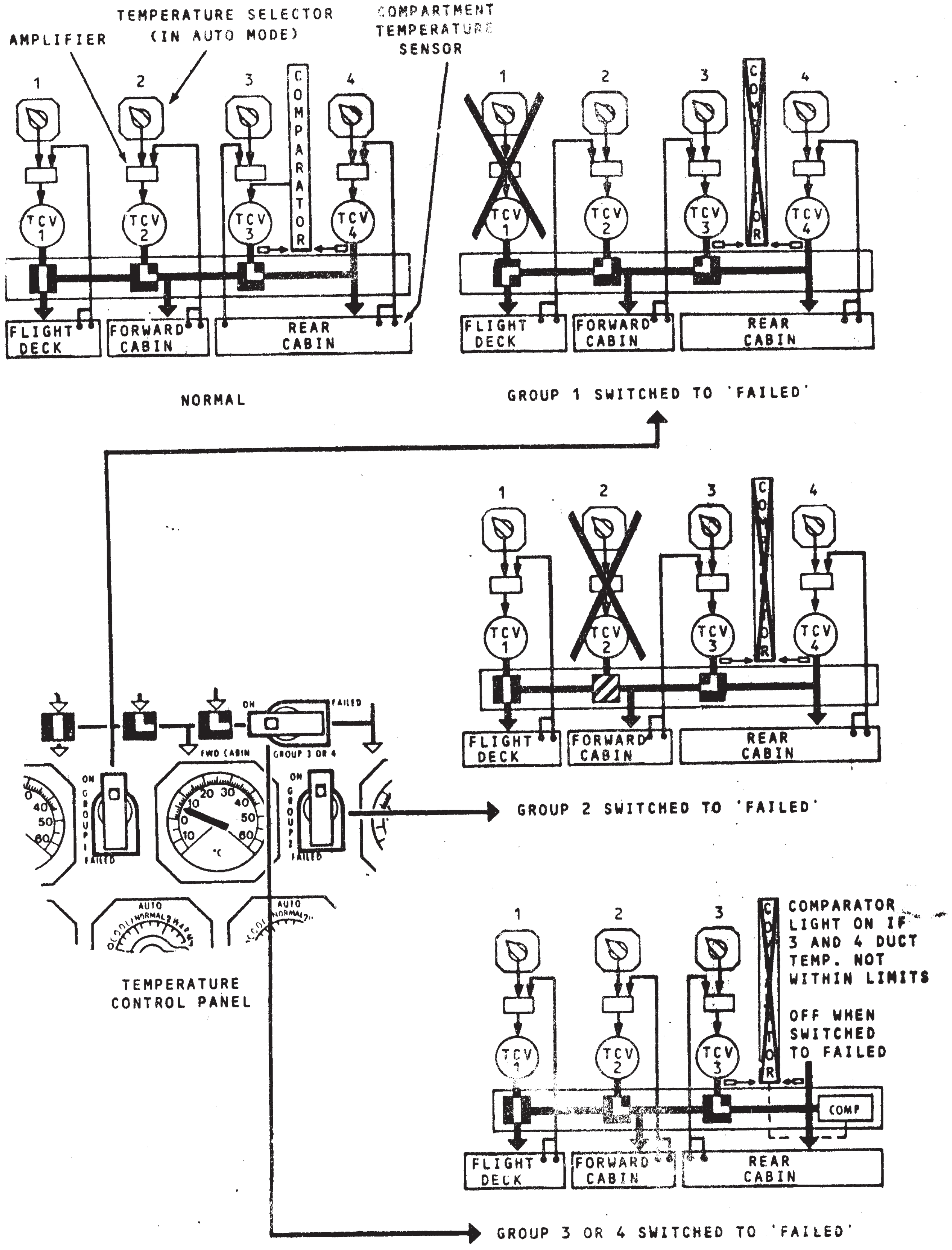
TEMPERATURE CONTROL AND INDICATION (SHEET 2 OF 2)



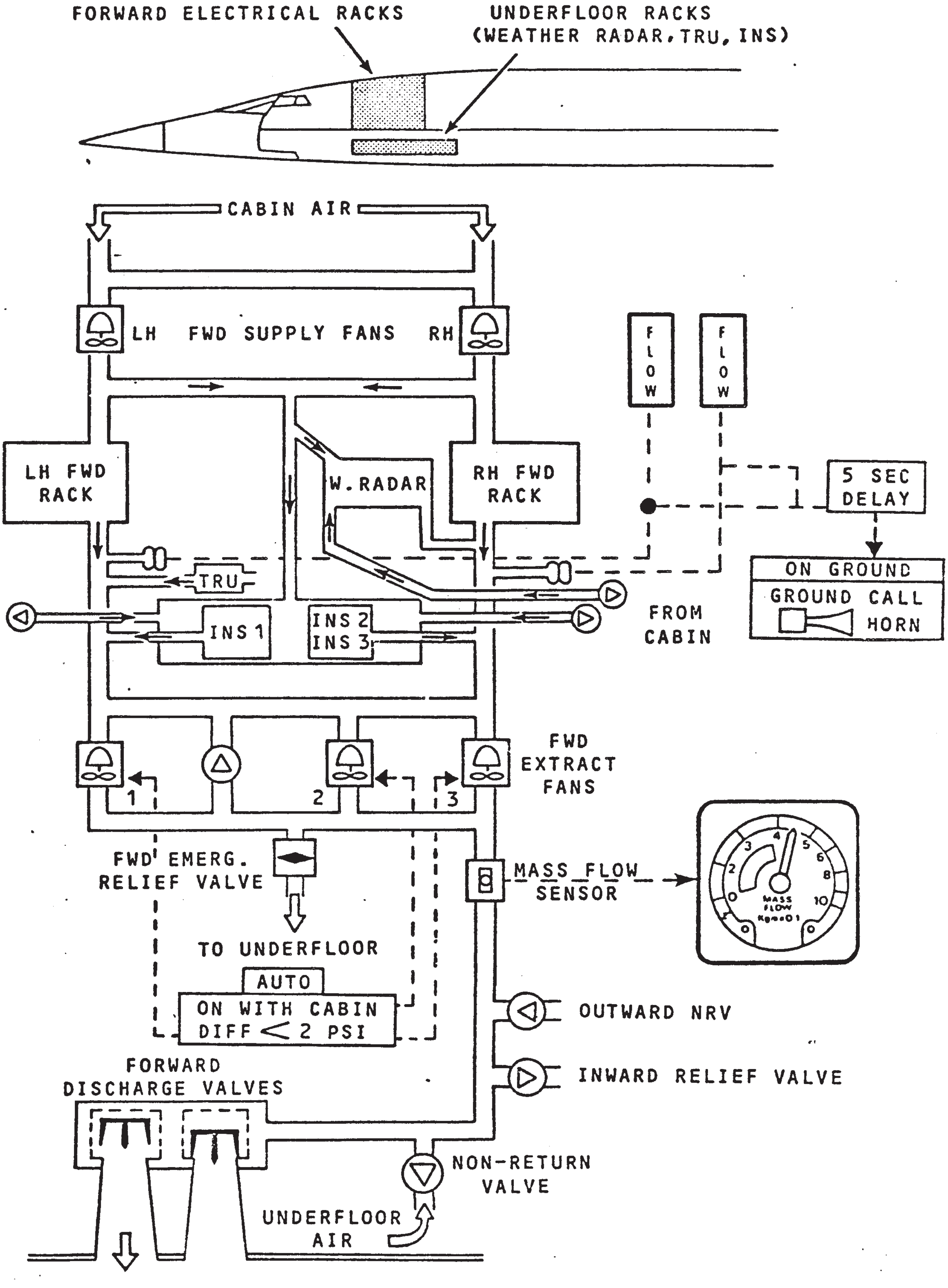
NOTE

ONE GROUP ONLY SHOWN.
OTHER THREE GROUPS SIMILAR
EXCEPT GROUPS 3 & 4 SLAVING

TEMPERATURE CONTROL - SUPPLY GROUP FAILURES


AMPLIFIER
TEMPERATURE SELECTOR (IN AUTO MODE)
COMPARTMENT TEMPERATURE SENSOR
1
2
3
4
COMPARATOR
TCV 1
TCV 2
TCV 3
TCV 4
FLIGHT DECK
FORWARD CABIN
REAR CABIN
NORMAL
GROUP 1 SWITCHED TO 'FAILED'
GROUP 2 SWITCHED TO 'FAILED'
ON
FAILED
FWD CABIN
GROUP 3 OR 4
ON GROUP 1 FAILED
ON GROUP 2 FAILED
°C
AUTO
NORMAL
WARM
COOL
TEMPERATURE CONTROL PANEL
COMPARATOR LIGHT ON IF 3 AND 4 DUCT TEMP. NOT WITHIN LIMITS
OFF WHEN SWITCHED TO FAILED
COMP
GROUP 3 OR 4 SWITCHED TO 'FAILED'

(Unchanged)



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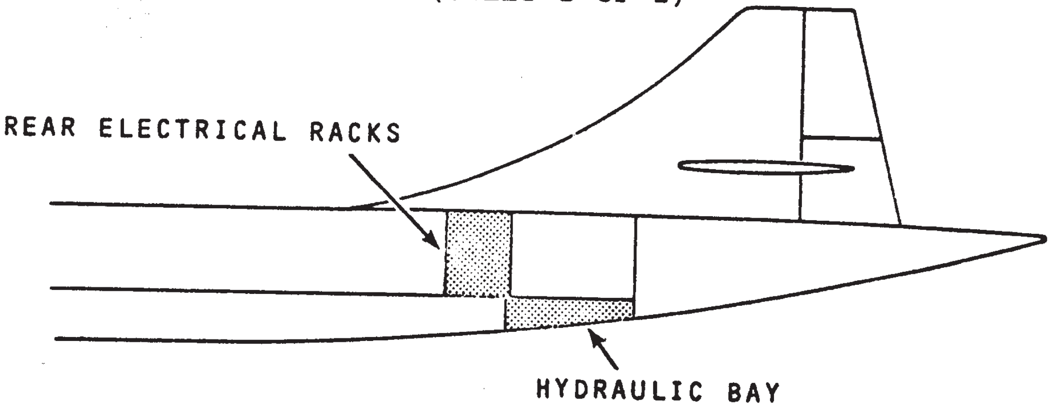
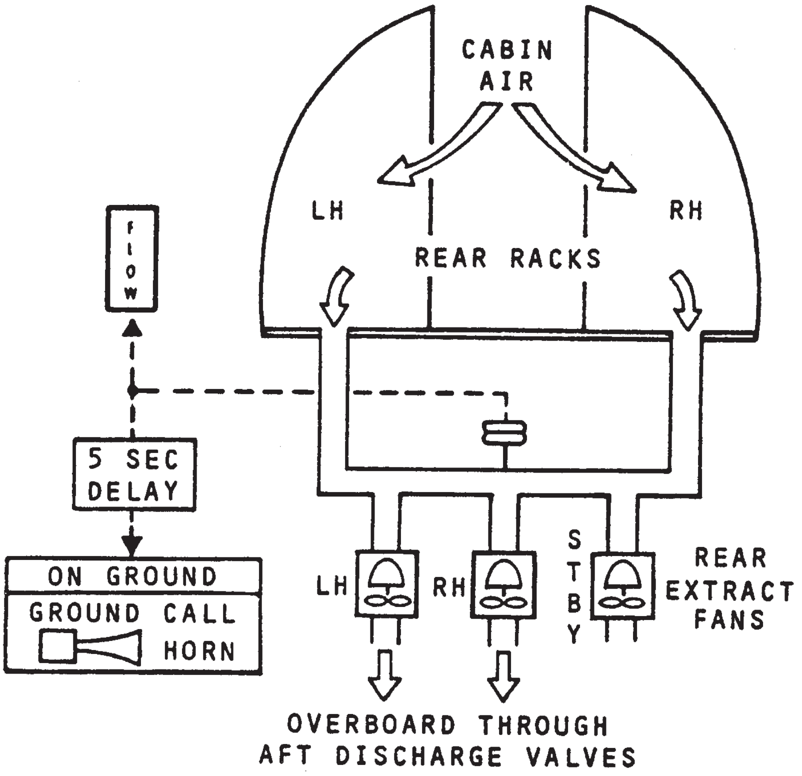
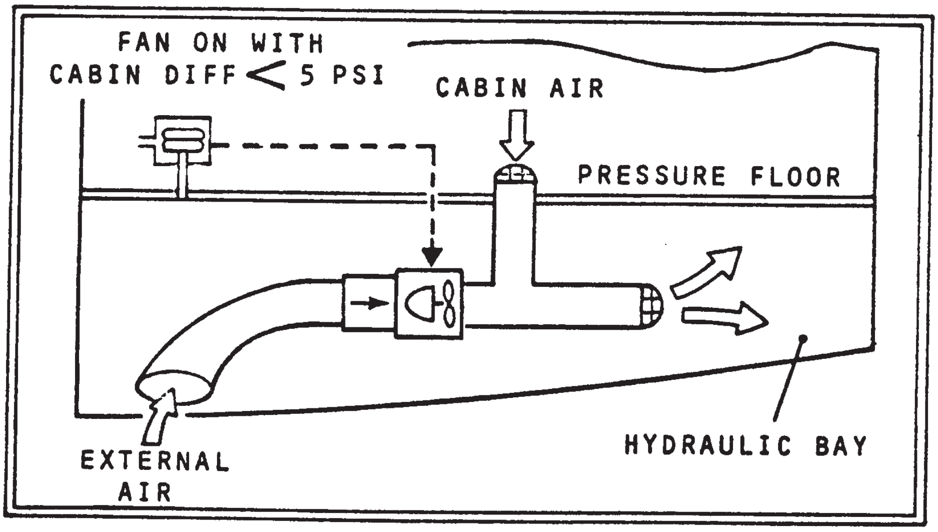
EQUIPMENT BAY COOLING
(SHEET 2 OF 2)







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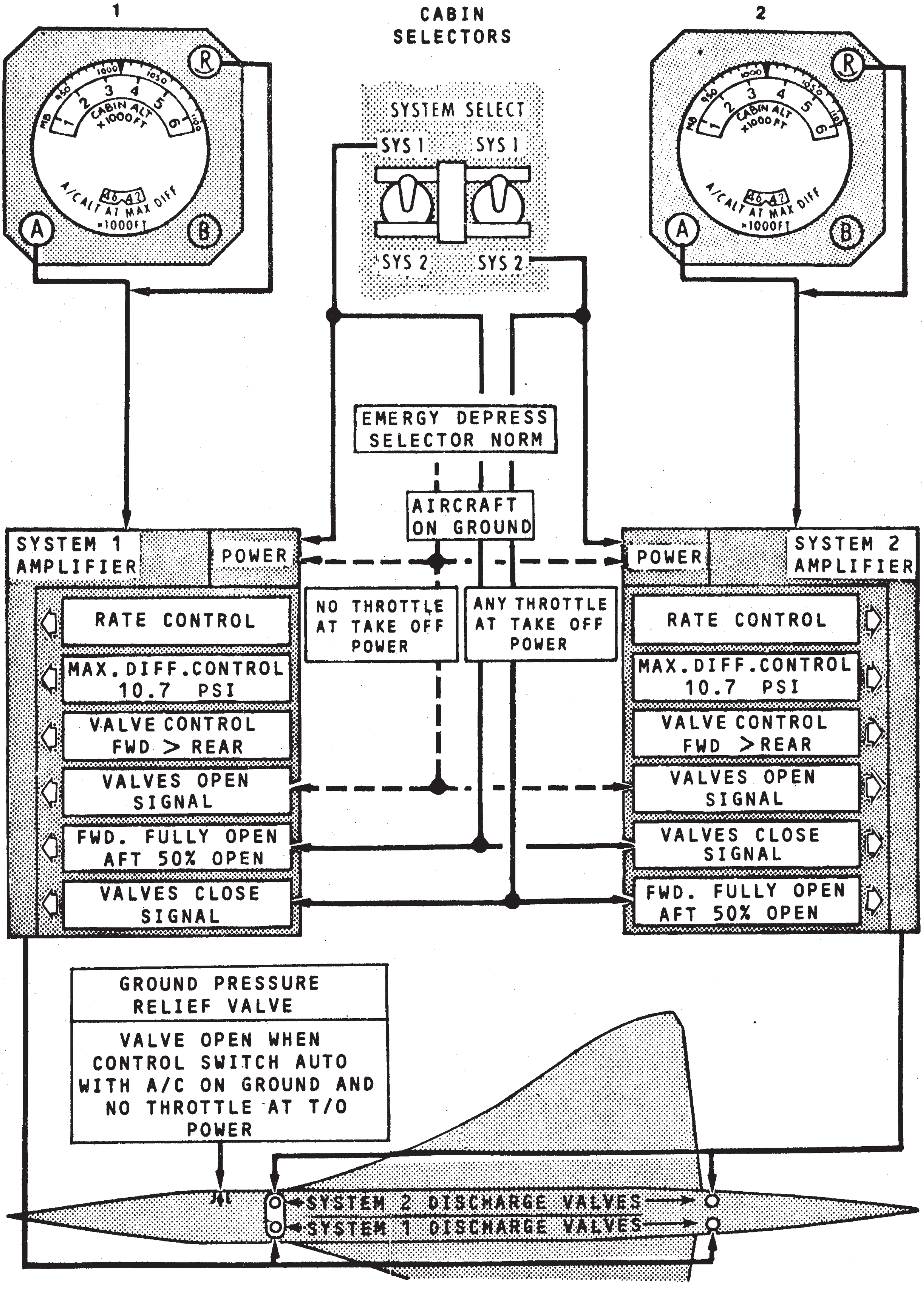
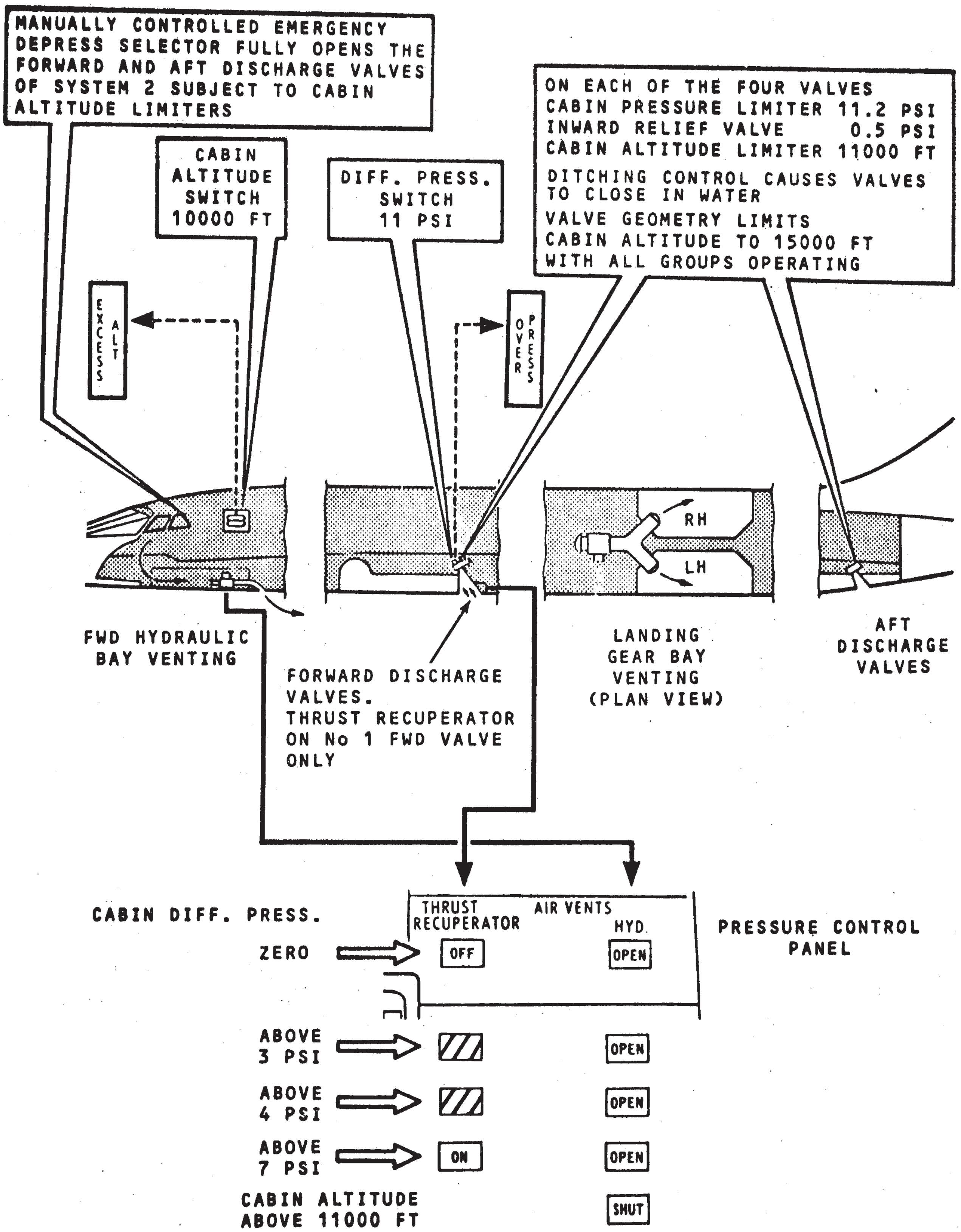
PRESSURE CONTROL


1
CABIN SELECTORS
2
R
MB 950 1000 1030
1 2 3 4 5 6
CABIN ALT x1000 FT
A/C ALT AT MAX DIFF x1000 FT
36 42
A
B
SYSTEM SELECT
SYS 1
SYS 1
SYS 2
SYS 2
EMERGY DEPRESS SELECTOR NORM
AIRCRAFT ON GROUND
SYSTEM 1 AMPLIFIER
POWER
NO THROTTLE AT TAKE OFF POWER
ANY THROTTLE AT TAKE OFF POWER
POWER
SYSTEM 2 AMPLIFIER
RATE CONTROL
MAX. DIFF. CONTROL 10.7 PSI
VALVE CONTROL FWD > REAR
VALVES OPEN SIGNAL
FWD. FULLY OPEN AFT 50% OPEN
VALVES CLOSE SIGNAL
RATE CONTROL
MAX. DIFF. CONTROL 10.7 PSI
VALVE CONTROL FWD > REAR
VALVES OPEN SIGNAL
VALVES CLOSE SIGNAL
FWD. FULLY OPEN AFT 50% OPEN
GROUND PRESSURE RELIEF VALVE
VALVE OPEN WHEN CONTROL SWITCH AUTO WITH A/C ON GROUND AND NO THROTTLE AT T/O POWER
SYSTEM 2 DISCHARGE VALVES
SYSTEM 1 DISCHARGE VALVES

PRESSURIZATION - SAFETY DEVICES



MANUALLY CONTROLLED EMERGENCY DEPRESS SELECTOR FULLY OPENS THE FORWARD AND AFT DISCHARGE VALVES OF SYSTEM 2 SUBJECT TO CABIN ALTITUDE LIMITERS

CABIN ALTITUDE SWITCH 10000 FT

DIFF. PRESS. SWITCH 11 PSI

ON EACH OF THE FOUR VALVES
CABIN PRESSURE LIMITER 11.2 PSI
INWARD RELIEF VALVE 0.5 PSI
CABIN ALTITUDE LIMITER 11000 FT

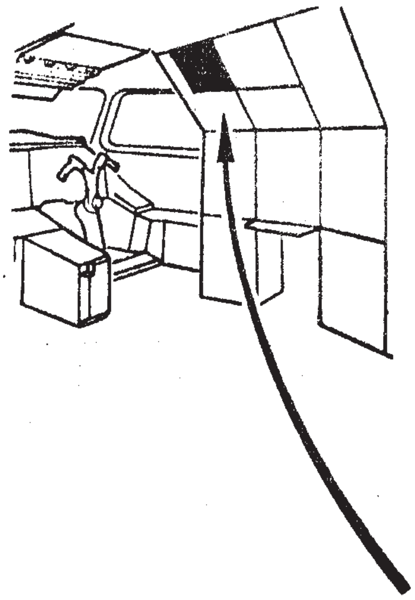
DITCHING CONTROL CAUSES VALVES TO CLOSE IN WATER

VALVE GEOMETRY LIMITS CABIN ALTITUDE TO 15000 FT WITH ALL GROUPS OPERATING

FORWARD DISCHARGE VALVES.
THRUST RECUPERATOR ON No 1 FWD VALVE ONLY

PRINTED IN ENGLAND

CABIN PRESSURE CONTROL PANEL (Sheet 1 of 3)

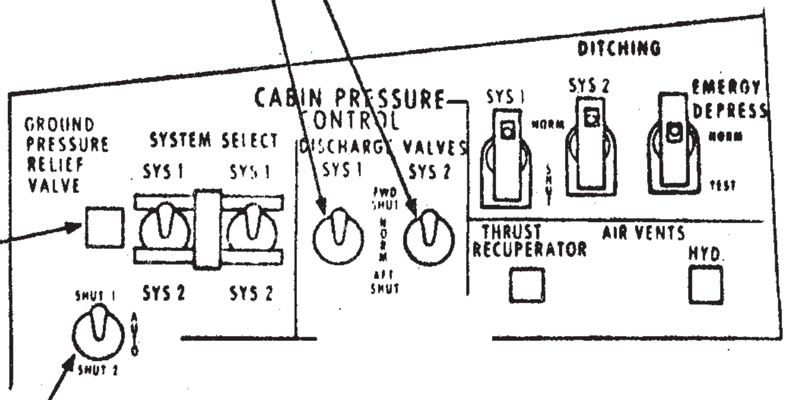


DISCHARGE VALVES SYSTEM 1 AND SYSTEM 2 SELECTORS

FWD SHUT - energizes a solenoid on the forward discharge valve of the corresponding system causing it to shut.

NORM - allows normal control of the discharge valves.

AFT SHUT - energizes a solenoid on the aft discharge valve of the corresponding system causing it to shut.



GROUND PRESSURE RELIEF VALVE MI

SHUT ▨ OPEN

GROUND PRESSURE RELIEF VALVE SELECTOR

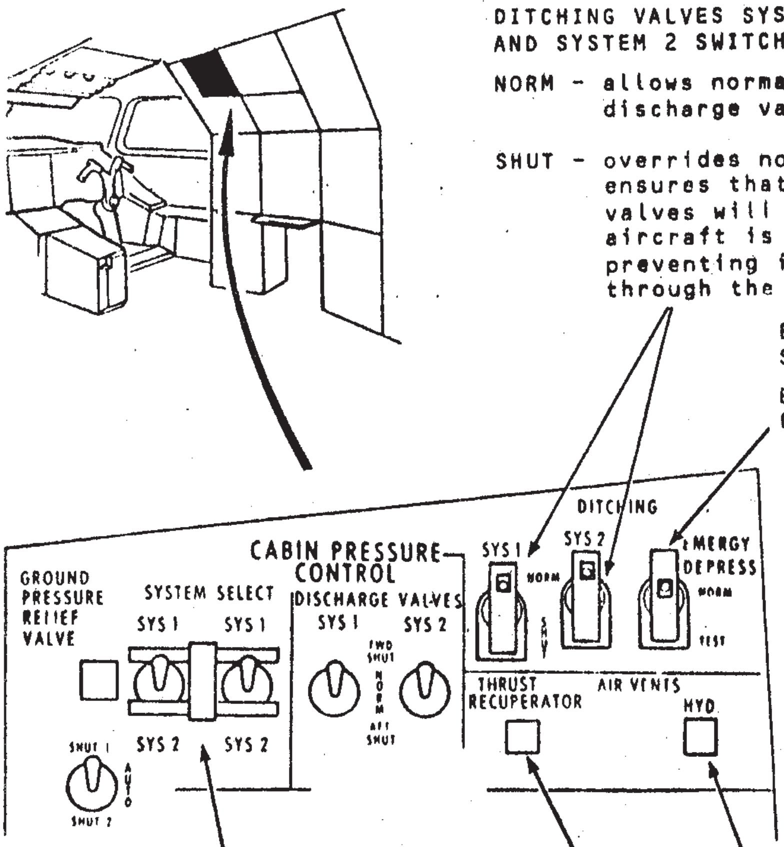
SHUT 1 - the No. 1 motor is energized and shuts the ground pressure relief valve.

AUTO - the ground pressure relief valve opens or shuts according to the position of the throttle levers and the aircraft weight switches. When the aircraft is on the ground and the four throttle levers are at a setting less than the take off power the ground pressure relief valve will be open. The ground pressure relief valve is normally operated by both electric motors.

SHUT 2 - the No. 2 motor is energized and shuts the ground pressure relief valve.

A locking safety system operates when the differential pressure exceeds 1.45 psi and prevents opening.

CABIN PRESSURE CONTROL PANEL (Sheet 2 of 3)



DITCHING VALVES SYSTEM 1 AND SYSTEM 2 SWITCHES

NORM - allows normal control of the discharge valves.

SHUT - overrides normal control and ensures that the discharge valves will shut when the aircraft is ditched thus preventing ingress of water through the discharge valves.

EMERGENCY DEPRESSURIZATION SELECTOR

EMERG DEPRESS - Allows the cabin differential pressure to reduce to zero if flight altitude is less than 11,000 ft or to the differential pressure corresponding to a cabin altitude of 11,000 ft if the flight altitude is more than 11,000 ft

NORM - allows normal control of the discharge valves.

TEST - cancels the normal function and is only used for maintenance purposes.

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AIR VENTS HYDRAULIC MI

OPEN

▨

SHUT - when cabin altitude exceeds 11,000 ft.

THRUST RECUPERATOR MI

OFF - when the differential pressure is less than 3 psi.

▨

ON

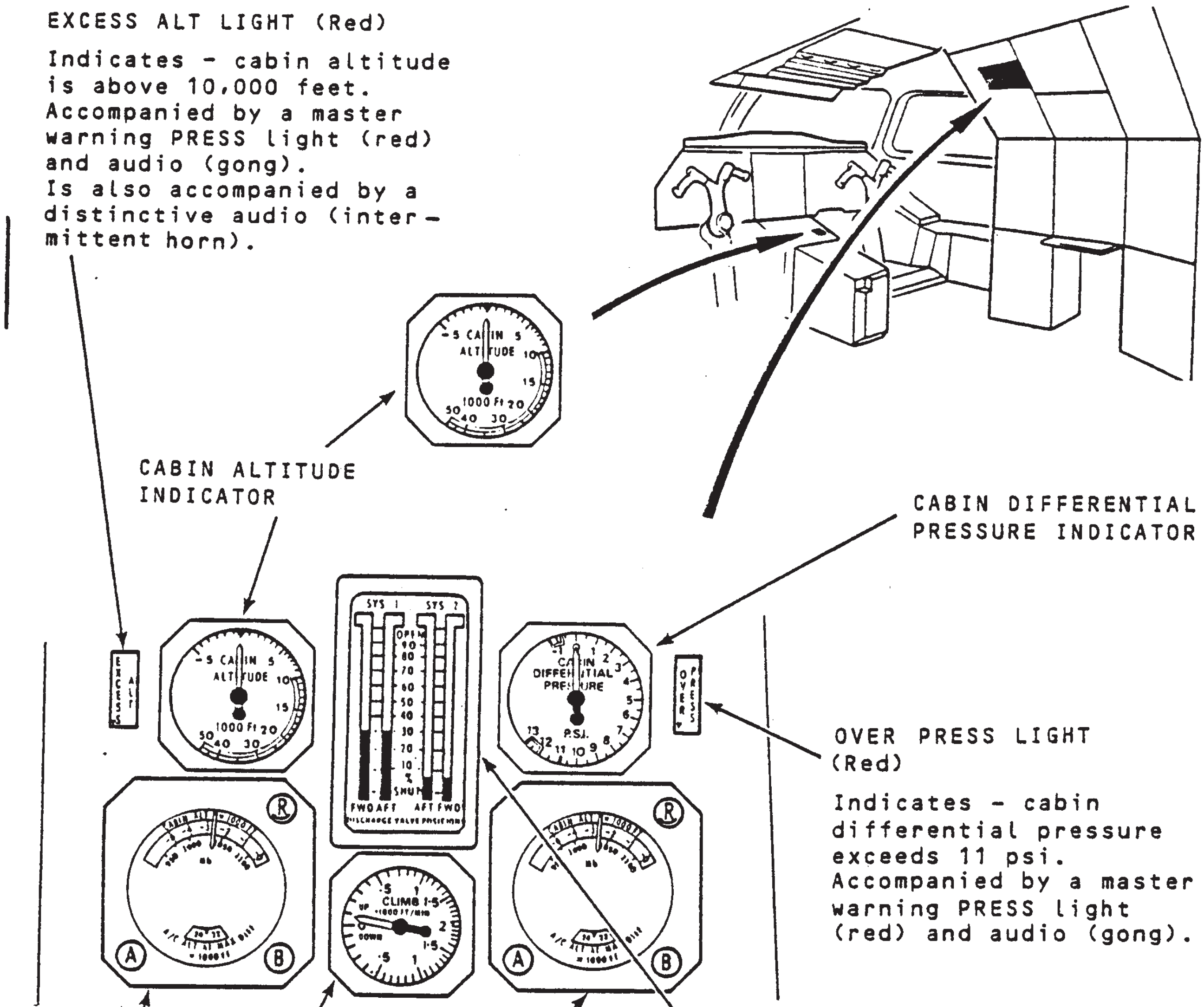
SYSTEM SELECT SWITCHES (2)

SYS 1 - the system 1 discharge valves are controlled by the system 1 cabin altitude selector. The system 2 discharge valves are closed except when the aircraft is on the ground and the throttles are away from the fully forward position.

SYS 2 - the system 2 discharge valves are controlled by the system 2 cabin altitude selector. The system 1 discharge valves are closed except when the aircraft is on the ground and the throttles are away from the fully forward position.

NOTE: both switches should always be in the same position

CABIN PRESSURE CONTROL PANEL (Sheet 3 of 3)



EXCESS ALT LIGHT (Red)

Indicates - cabin altitude is above 10,000 feet. Accompanied by a master warning PRESS light (red) and audio (gong). Is also accompanied by a distinctive audio (intermittent horn).

CABIN ALTITUDE INDICATOR

CABIN DIFFERENTIAL PRESSURE INDICATOR

OVER PRESS LIGHT (Red)

Indicates - cabin differential pressure exceeds 11 psi. Accompanied by a master warning PRESS light (red) and audio (gong).

CABIN RATE OF CLIMB INDICATOR

SYSTEM 1 AND SYSTEM 2 ALTITUDE SELECTORS

R - sets rate of change of cabin altitude, the white dot indicates approximately 400 fpm setting.
B - sets the barometric pressure datum.
A - sets the required cabin altitude.
At the same time the bottom window shows the altitude at which maximum differential pressure will be reached with the required cabin altitude.

DISCHARGE VALVE POSITION INDICATOR

In flight the forward indicator of the operating system normally indicates a greater opening than the aft indicator. A red and black striped flag appearing at the top of a discharge valve position scale indicates loss of electrical power to that indication.

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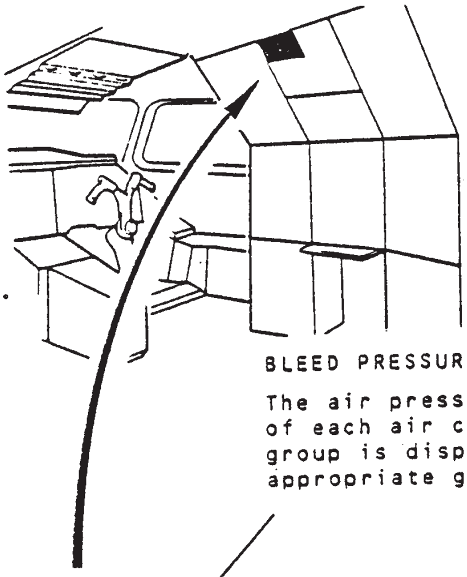
AIR BLEED CONTROL PANEL (Sheet 1 of 3)

BLEED VALVES MI (4)

▬

▨

▮ -Crossline only when both the shut off and pressure reducing valves are shut regardless of the bleed valve switch position.



BLEED PRESSURE GAUGE (4)

The air pressure at the inlet of each air conditioning group is displayed on the appropriate gauge

BLEED VALVES SWITCH (4)

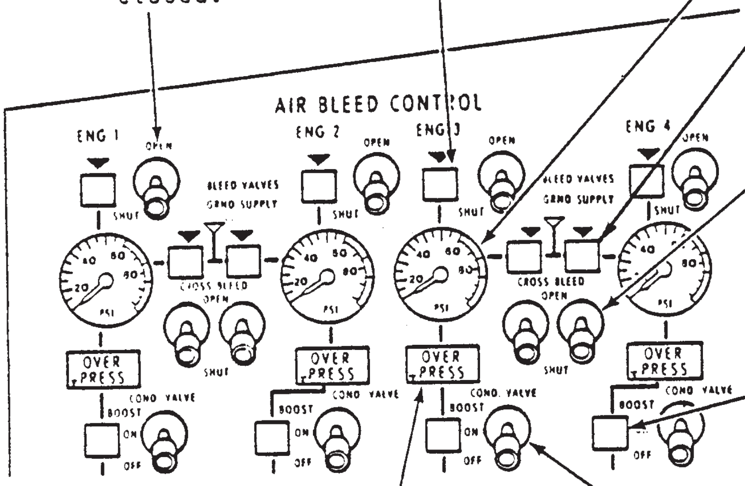
OPEN - signals the bleed valve to open except when the engine shut down handle is pulled or when the cabin inlet safety valve is closed.

CROSS BLEED VALVE MI (4)

▬ ▨ ▮

CROSS BLEED VALVE SWITCH (4)

OPEN - allows cross bleeding between two adjacent supplies on the same side of the aircraft, except when the shut down handle is pulled or when the cabin inlet safety valve is closed.



CONDITIONING VALVE MI (4)

▬ ▨ ▮

OVER PRESS LIGHT (Amber) (4)

On - indicates that the air pressure downstream of the corresponding bleed valve exceeds 85 psi. Accompanied by MWS AIR (amber)

The overpressure detection latches the light on and closes and latches the bleed valve.

NOTE: When the OVER PRESS light is pressed it closes the bleed valve; it opens after an 8 seconds delay.

CONDITIONING VALVE SELECTOR (4)

BOOST - increases the regulation value of the mass flow valve located downstream of the conditioning valve.

ON - allows the supply air to flow into its air conditioning group, powers the automatic temperature control system and for groups 3 and 4, the comparator unit. A 30 seconds opening time ensures a smooth entry of air into the system.

OFF - the conditioning valve is shut thus isolating the air conditioning group from the air supply.

NOTE - PRIM EXCH, SEC EXCH and DUCT warnings will automatically shut the conditioning valve and mass flow valve regardless of the selector position.

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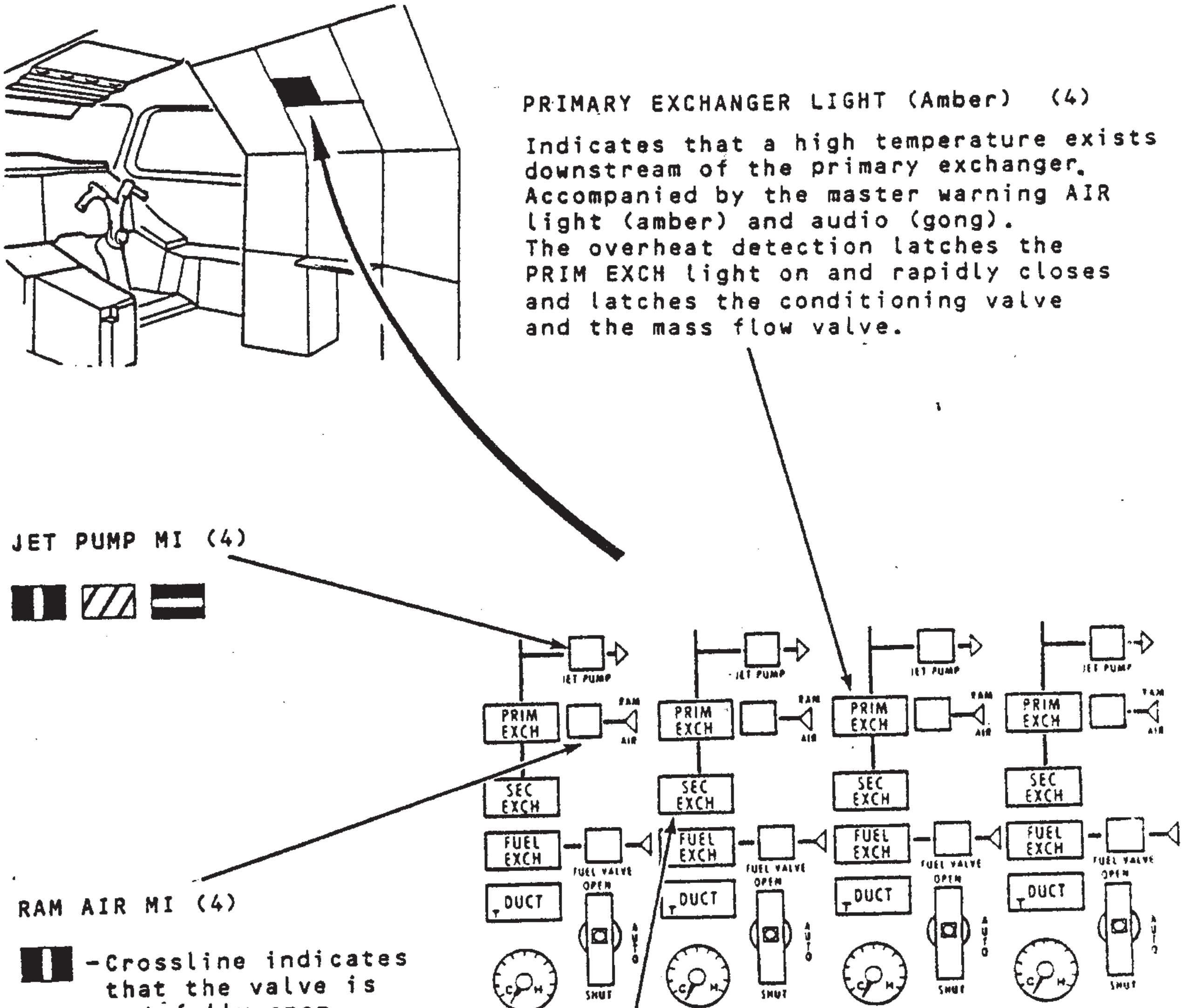
(Unchanged)

AIR BLEED CONTROL PANEL (Sheet 2 of 3)



PRIMARY EXCHANGER LIGHT (Amber) (4)

Indicates that a high temperature exists downstream of the primary exchanger. Accompanied by the master warning AIR light (amber) and audio (gong). The overheat detection latches the PRIM EXCH light on and rapidly closes and latches the conditioning valve and the mass flow valve.

JET PUMP MI (4)

▮ ▨ ▬

RAM AIR MI (4)

▮ -Crossline indicates that the valve is not fully open.

▨

▬ -Inline indicates that the valve is fully open.

SECONDARY EXCHANGER LIGHT (Amber) (4)

Indicates that a high temperature exists downstream of the secondary exchanger. Accompanied by the master warning AIR light (amber) and audio (gong) The overheat detection latches the SEC EXCH light on and rapidly closes and latches the conditioning valve and the mass flow valve.

(Unchanged)

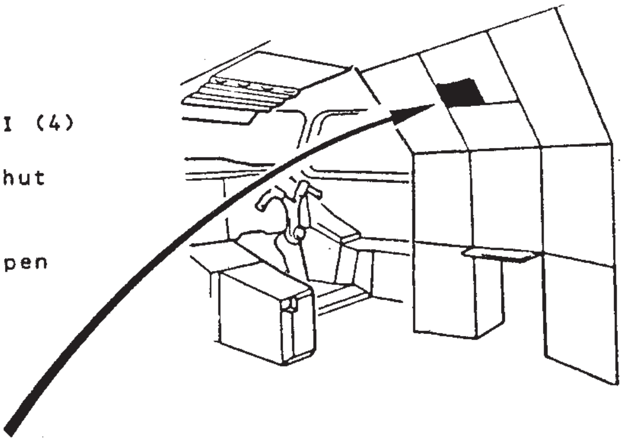
AUR BLEED CONTROL PANEL (Sheet 3 of 3)

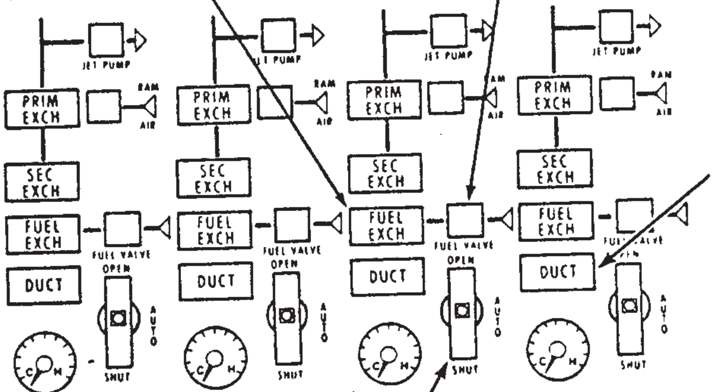
FUEL EXCHANGER LIGHT
(Yellow) (4)

Indicates that a high temperature exists downstream of the fuel/air heat exchanger.
The overheat detection latches the FUEL EXCH light on and opens and latches the fuel valve.
The fuel valve can be reset by selecting the FUEL VALVE selector to OPEN or SHUT.

FUEL VALVE MI (4)

▮	Valve shut
▨	
▬	Valve open





DUCT LIGHT (Amber) (4)

Indicates that a high temperature exists downstream of the fuel/air heat exchanger

or

The temperature downstream of the cold air unit exceeds 120 deg.C

or

A high differential pressure exists between the cold air unit outlet and the pressurized fuselage.

The overheat and overpressure detections latch the DUCT light on and rapidly close and latch the conditioning valve and mass flow valve.

May also indicate a high temperature exists in the duct upstream of the distribution manifold.
This overheat detection latches the DUCT light on and closes and latches the bleed valve, crossbleed valves and cabin inlet safety valves.

Accompanied by a master warning AIR light (amber) and audio (gong).

NOTE: Pressing the DUCT light closes the bleed and crossbleed valves. After eight seconds the cabin inlet safety valve is closed and the DUCT light is on.

Eight seconds after releasing the DUCT light, the cabin inlet safety valve is open and the DUCT light is off.

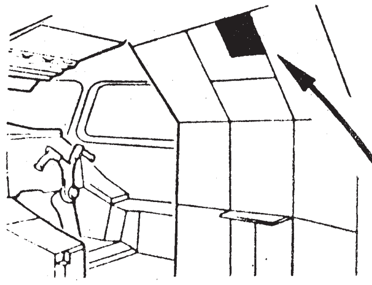
FUEL VALVE SELECTOR (4)

AUTO - the fuel flow through the heat exchanger is controlled by a controller using the temperature of the fuel and the conditioning air temperature upstream and downstream of the fuel/air heat exchanger.

TEMPERATURE CONTROL VALVE POSITION INDICATOR (4)

Shows the position of the temperature control valve which regulates the amount of air by-passing the cold air unit. When the indicator reads C the valve is shut.

TEMPERATURE CONTROL PANEL (Sheet 1 of 2)



Failure Flag (Red and Black)

Shows no electrical power to instrument.

CAU INLET TEMPERATURE GAUGE (4)

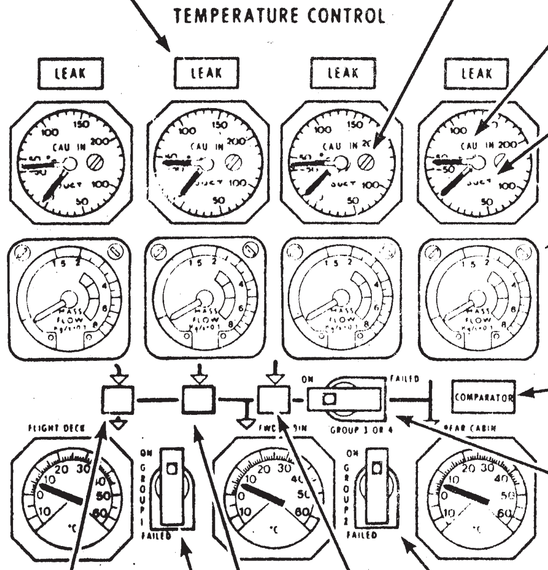
Shows the cold air unit inlet temperature

DUCT TEMPERATURE

Shows the air temperature at the mixing point downstream of the cold air unit.

LEAK LIGHT (Yellow) (4)

Indicates a leak in the double wall of the cold air unit.



MASS FLOW GAUGE (4)

Shows the air mass flow for each air conditioning group upstream of the distribution manifold.

COMPARATOR LIGHT (Yellow)

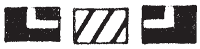
Indicates a discrepancy exists between temperatures at the mixing point of group 3 and group 4 or the comparator has failed.

GROUP 3 OR 4 SWITCH

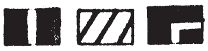
ON - selects the control of the rear cabin temperature to group 4 and providing the group 3 temperature selector is at AUTO slaves the control of group 3 to group 4.

FAILED - unslaves group 3 from group 4 leaving both under AUTO control and inhibits the comparator system.

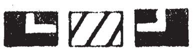
GROUP 3 MI



GROUP 1 MI



GROUP 2 MI



GROUP 1 SWITCH

ON - selects the control of the flight deck temperature to group 1

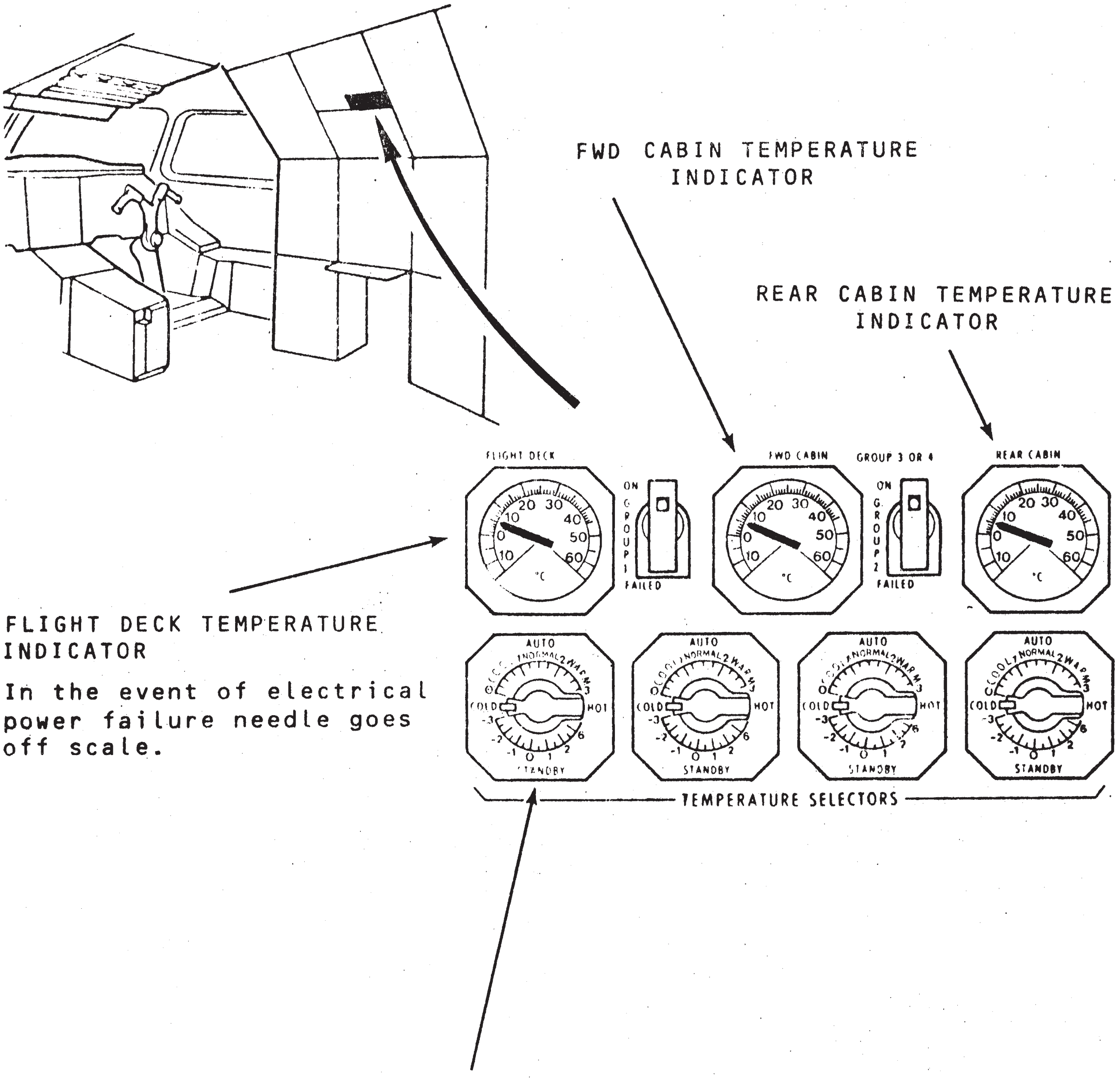
FAILED - selects the control of the flight deck temperature to group 2, the control of the forward cabin temperature to group 3 and unslaves group 3 and 4 thus:-
Group 2 selector controls the flight deck temperature.
Group 3 selector controls the forward cabin temperature.
Group 4 selector controls the rear cabin temperature.

GROUP 2 SWITCH

ON - selects the control of the forward cabin temperature to group 2.

FAILED - selects the control of the forward cabin temperature to group 3 and unslaves group 3 and 4 thus:-
Group 1 selector controls the flight deck temperature.
Group 3 selector controls the forward cabin temperature
Group 4 selector controls the rear cabin temperature.

TEMPERATURE CONTROL PANEL (Sheet 2 of 2)



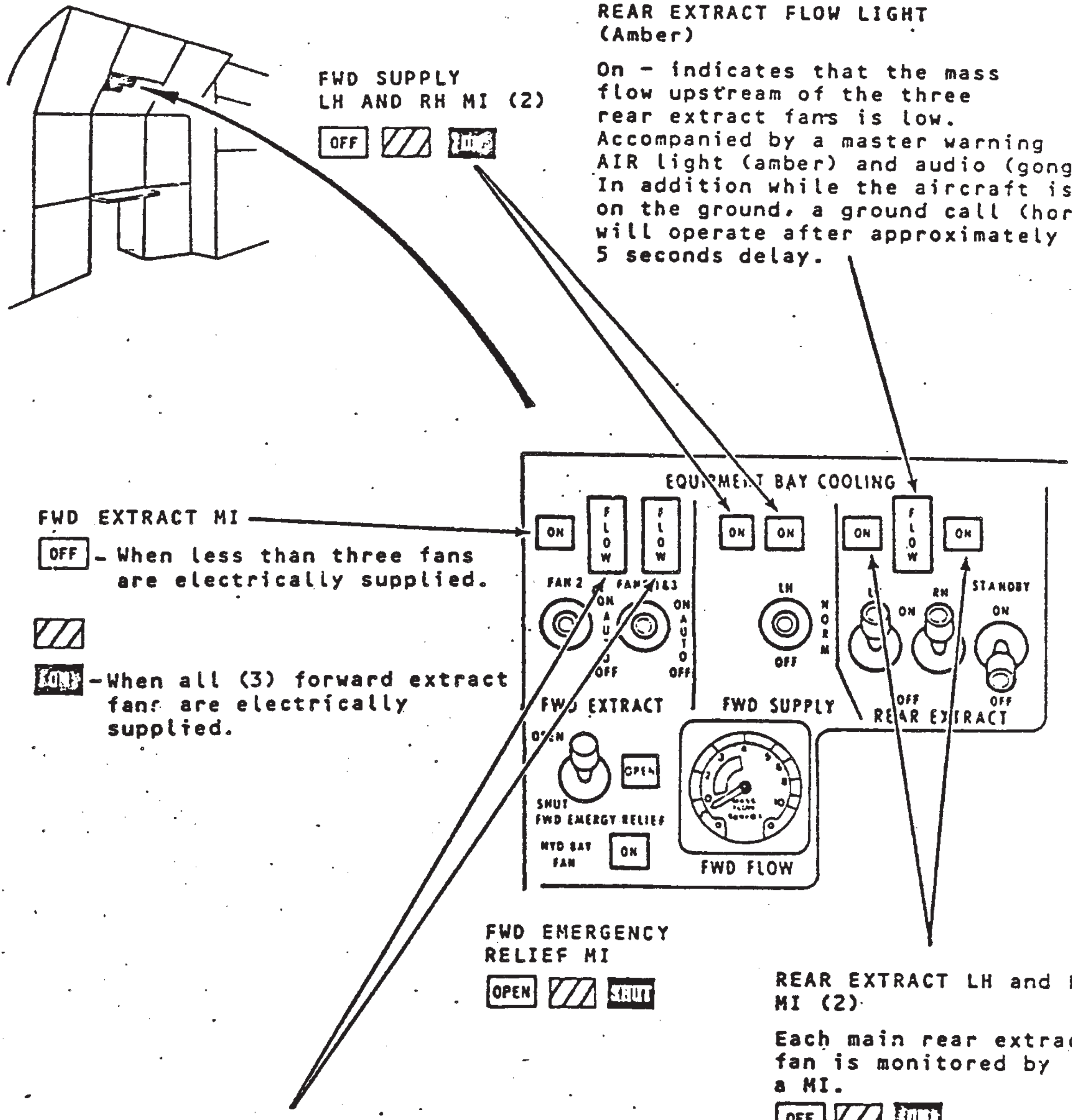
FLIGHT DECK TEMPERATURE INDICATOR

In the event of electrical power failure needle goes off scale.

TEMPERATURE ROTARY SELECTOR (4)

AUTO - sends a signal to the temperature control valve, through the auto amplifier, which varies the duct air temperature, until the difference between the selected compartment temperature and actual compartment temperature is approximately zero.

STANDBY - sends a signal to the temperature control valve, through the standby amplifier, which varies the duct air temperature, until the difference between the selected and actual duct air temperature is approximately zero.
The AUTO mode of the affected group is inoperative and if groups 3 or 4 are affected the COMPARATOR function is inhibited.
Once the rotary selector is in the STANDBY arc the required duct temperature is set on the numerical scale.



FWD SUPPLY LH AND RH MI (2)

OFF ▨ ON

REAR EXTRACT FLOW LIGHT (Amber)

On - indicates that the mass flow upstream of the three rear extract fans is low. Accompanied by a master warning AIR light (amber) and audio (gong) In addition while the aircraft is on the ground, a ground call (horn) will operate after approximately 5 seconds delay.

FWD EXTRACT MI

OFF - When less than three fans are electrically supplied.

▨

ON - When all (3) forward extract fans are electrically supplied.

FWD EMERGENCY RELIEF MI

OPEN ▨ SHUT

REAR EXTRACT LH and RH MI (2)

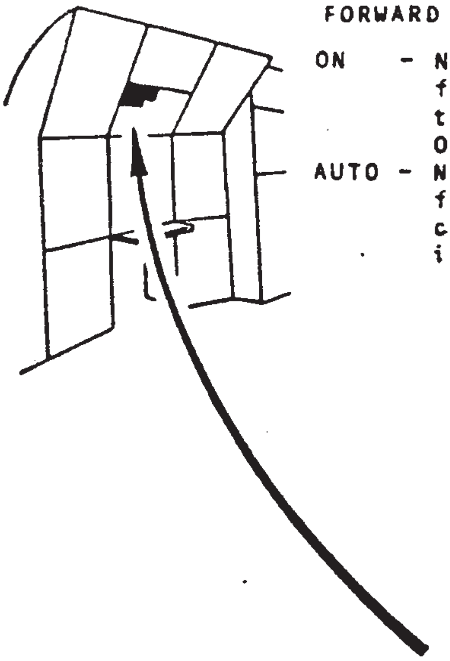
Each main rear extract fan is monitored by a MI.

OFF ▨ ON

FWD EXTRACT FLOW LIGHTS (Amber) - LH and RH

On - indicates that the mass flow from the affected side is below approximately 50% normal Accompanied by a master warning AIR light (amber) and audio (gong). In addition while the aircraft is on the ground, a ground call (horn) will operate after approximately 5 seconds delay.

(Completely Revised)



FORWARD EXTRACT FANS 1 & 3 SELECTOR

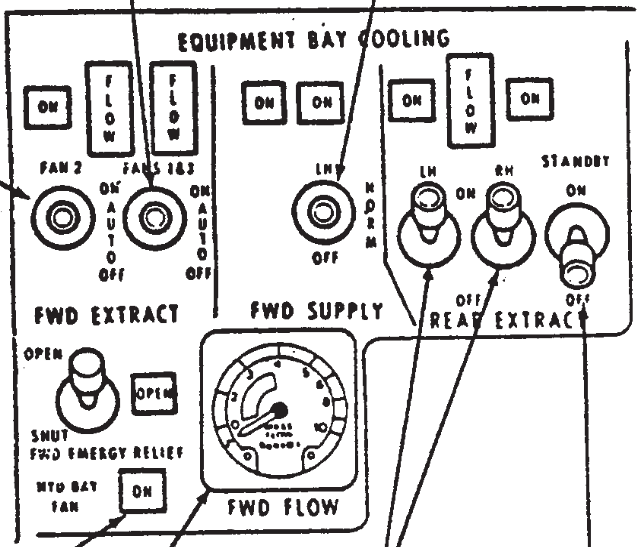
ON - No.1 & 3 forward extract fans run regardless of the differential pressure. Overrides its AUTO position.

AUTO - No.1 & 3 forward extract fans run so long as the cabin differential pressure is lower than 2 psi.

FORWARD SUPPLY SELECTOR

LH - The right hand fan is switched off.

NORM - two fans extract air from the cabin and exhaust it into the forward racks, the weather radar crate and inertial navigation crate.



FORWARD EXTRACT FAN NO.2 SELECTOR

ON - No.2 forward extract fan runs regardless of the differential pressure. Overrides its AUTO position.

AUTO - No.2 forward extract fan runs so long as the cabin differential pressure is lower than 2 psi.

FORWARD EMERGENCY RELIEF SWITCH

OPEN - the forward emergency relief valve permits flow of rack exhaust air to the underfloor area and then to the rear discharge valves.

HYDRAULIC BAY FAN MI

OFF ▨ ON

On - when the cabin differential is less than 5 psi.

REAR EXTRACT LH AND RH SWITCHES

LH ON - left hand fan runs.

RH ON - right hand fan runs.

FORWARD FLOW INDICATOR

Shows the mass flow downstream of the forward extract fans.

REAR EXTRACT STANDBY SWITCH

There is no MI associated with this fan.

(Completely Revised)

AIR CONDITIONING TEST

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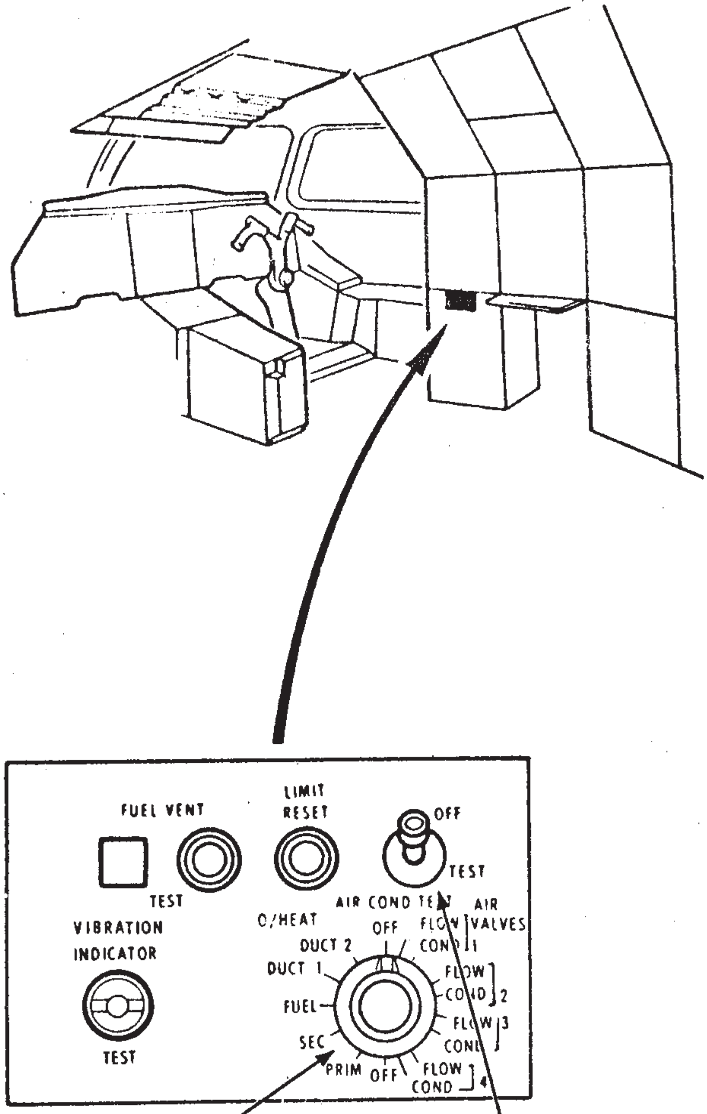

AIR CONDITIONING TEST ROTARY SELECTOR

When the AIR COND TEST switch is at TEST the AIR COND TEST rotary selector is used to test the electrical circuits of the air conditioning system warnings and the electrical operation of the safety closing for the conditioning valves and mass flow valves.

AIR CONDITIONING TEST SWITCH

OFF - cuts the electrical supply to the AIR COND TEST rotary selector.

TEST - arms the AIR COND TEST rotary selector.

Chapter 3

AUTOMATIC FLIGHT

AUTOMATIC FLIGHT

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Description and Operation 03.01.01

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Autoflight System 03.02.01
Autopilot/Flight Director No. 1 03.02.02
Autothrottle 03.02.03
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Automatic Landing Phases (Sheet 2 of 2) 03.02.05
Altitude Acquire - Visual Indication 03.02.06
Landing Display Test 03.02.07
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Attitude Director Indicator (Sheet 1 of 2) 03.03.02
Attitude Director Indicator (Sheet 2 of 2) 03.03.03
Flight Director Switches 03.03.04
Autopilot Switches 03.03.05
Autoflight Modes (Sheet 1 of 4) 03.03.06
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In-Flight Monitor 03.03.15

GENERAL

The automatic flight control system (AFCS) is designed to provide the capability for 'hands off' flight during climb, cruise and let down to a cat III landing and, if required, a go-around. The AFCS comprises the following subsystems, autothrottle, auto-pilot, warning and landing display and an interlock failure monitor and test system.

AUTOTHROTTLE

The autothrottle system provides thrust control of speed for approach and cruise flying. The system includes airspeed and Mach hold modes (with datum adjust provision) and an airspeed acquire mode which captures a selected speed in the range 130-400 kts subject to a longitudinal acceleration limit of 0.1g. The autothrottle system also provides protection against overspeeds when the autopilot is engaged in the MAX CRUISE mode. Throttle reduction is initiated by the autopilot during an automatic landing.

The autothrottle system comprises two separate channels each engaged by a separate switch. Both channels are normally engaged, channel 1 having control authority and channel 2 being in a synchronised standby condition. Each channel is self monitored and disengages automatically in the case of a self detected failure or a failure of the air data system or inertial system supplying it with manometric and attitude data.

The autothrottle is rate limited (5 degrees pilots lever angle/ second) and authority limited (-1 degree to - 36.5 degrees pilots lever angle). If engaged with the throttles reduced beyond the -36.5 degree position they automatically advance to it. Autothrottle switches allow autothrottle commands to be isolated from individual throttle levers so that individual adjustments may be made. Instinctive disconnect switches on outboard throttle levers disengage the autothrottle and as an ultimate safety measure slip clutches in the autothrottle drive mechanism allow direct manual override.

AUTOPILOT AND FLIGHT DIRECTOR

The aircraft installation comprises two separate channels each providing integrated autopilot and flight director systems. The input signals and computing are common to the autopilot and flight director. The autopilot signals operate the pitch, roll and yaw relays jacks in their autopilot mode (input lever locked, electrical input stages energised) and via the mechanical control linkages displace the pilots controls.

Normally both flight director channels are engaged but both autopilots may only be engaged after LAND mode is selected.

Selection of modes for both autopilot and flight director is common. If an autopilot is engaged with flight director already engaged the mode reverts to PITCH HOLD and HDG HOLD except if the flight director is in the LAND mode then the autopilot will also engage in LAND mode unless a GO-AROUND has been initiated, in which case engaging an autopilot will cause reversion to basic modes. If the flight director is engaged after autopilot the flight director engages in the modes already held by the autopilot. Modes which may be selected prior to automatic capture are provided with 'prime' lights to indicate successful arming. Subsequent selection of PITCH HOLD will de-select the 'primed' mode and extinguish the 'prime' light.

The autopilot is authority limited to plus or minus 0.15g and plus or minus 30° roll (plus 35° in turn control) and rate limited to plus or minus 0.10g per sec and 5° per sec except in LAND mode after glide slope capture, and in GO-AROUND when in pitch it is rate limited to plus 0.25g per sec. The autopilot servo loops are fully self monitored at all times. An autopilot instinctive disconnect button is placed on each handwheel and as an ultimate safety measure the mechanical linkage between the relay jack and the control column contains a compressible strut which allows the pilot to directly override the autopilot commands.

The approach modes are fully self-monitored and with both autopilots engaged in LAND mode full failure survival is provided (autopilot 1 having priority with autopilot 2 engaged in a synchronised standby state).

A failure of peripheral systems will cause the autopilot to disconnect if it is engaged in a mode which uses data from that system. A failure of ILS data on the approach does not cause the autopilot to disconnect if radio altitude exceeds 600 feet to avoid nuisance disconnects (the autopilot signal is zeroed and the flight director bars removed); an ILS failure before capture will inhibit capture of that beam. A simultaneous failure of both Glide receivers between 200 feet and 75 feet radio altitude, or both Localiser receivers below 200 feet, (most probably caused by interference with the beam or transmitter) will not disconnect the autopilot but will bring on the AUTOLAND light

DATUM ADJUST

A datum adjust unit allows small adjustments to the speed hold modes of the autothrottle and the pitch modes of the autopilot. The pitch datum adjust is zeroed and inhibited in MAX CRUISE mode. In heading hold mode an autopilot turn knob allows adjustment of heading at a fixed roll rate.

WARNING AND LANDING DISPLAY

The system provides information on the operational status and functional capability of the automatic flight control system in its automatic approach and landing role and displays autopilot and auto throttle warnings during cruise flying.

The system comprises two independent channels which operate at the same time. Channel 1 feeds the Captain's display and channel 2 the First Officer's but the most important warnings are cross fed so that both pilots receive key information even when one channel has failed.

PRINT. N ENGLAND

Certain malfunctions in the latter stages of an automatic landing cause illumination of the AUTOLAND light which indicates that either a manual take over or an Automatic Go Around must be initiated.

ALTITUDE ALERT SYSTEM

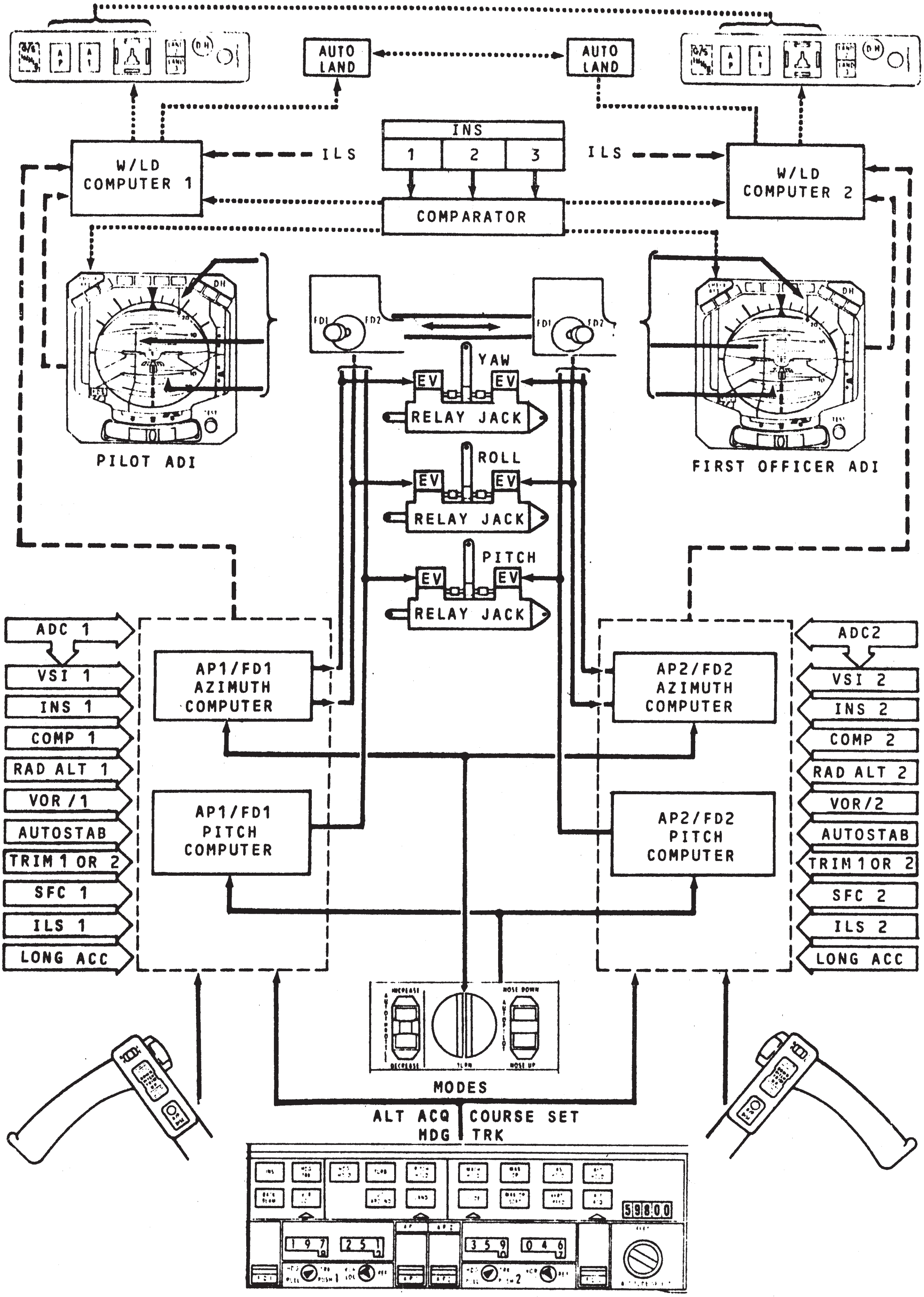
This provides audible and visual warning of approach to and deviation from the altitude selected on the AFCS control panel. Although integrated with the autopilot/flight director for economy and ease of operation the function is independent of AFCS engagement states. The warning of deviation from the selected altitude is inhibited with landing gear down when airborne.

INTERLOCK FAILURE MONITOR & TEST SYSTEM

This system continually surveys the engagement states of the auto-pilot, flight director, autothrottle, autostab, trim, safety flight and warning and landing display systems and all the peripheral systems which supply them with data. Any unintentional disengagement is analysed to determine the root cause and this item is displayed on the panel and stored for subsequent recall by ground crew even after power removal.

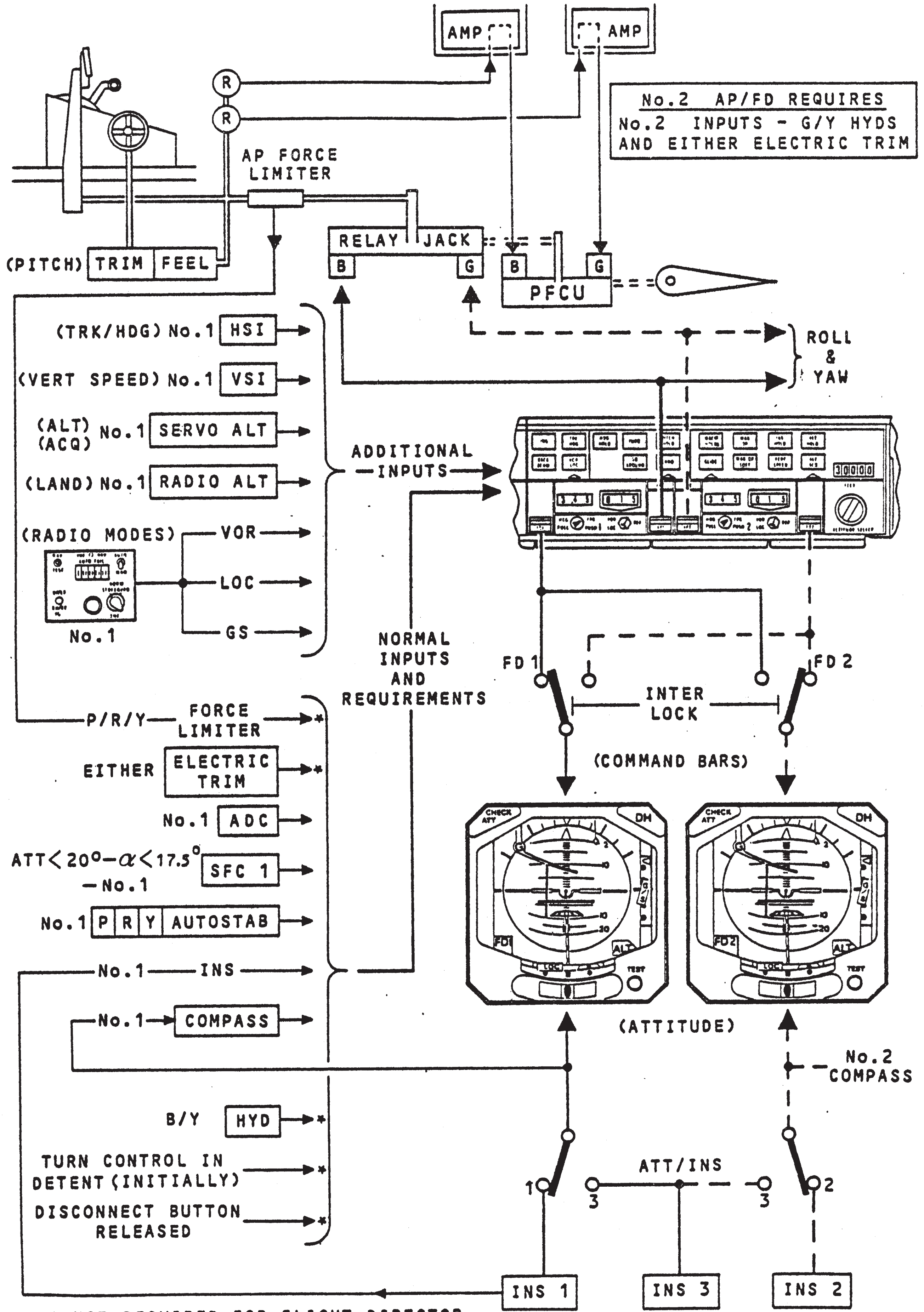
PRINTED IN ENGLAND

AUTOFLIGHT SYSTEM



(Deletion)

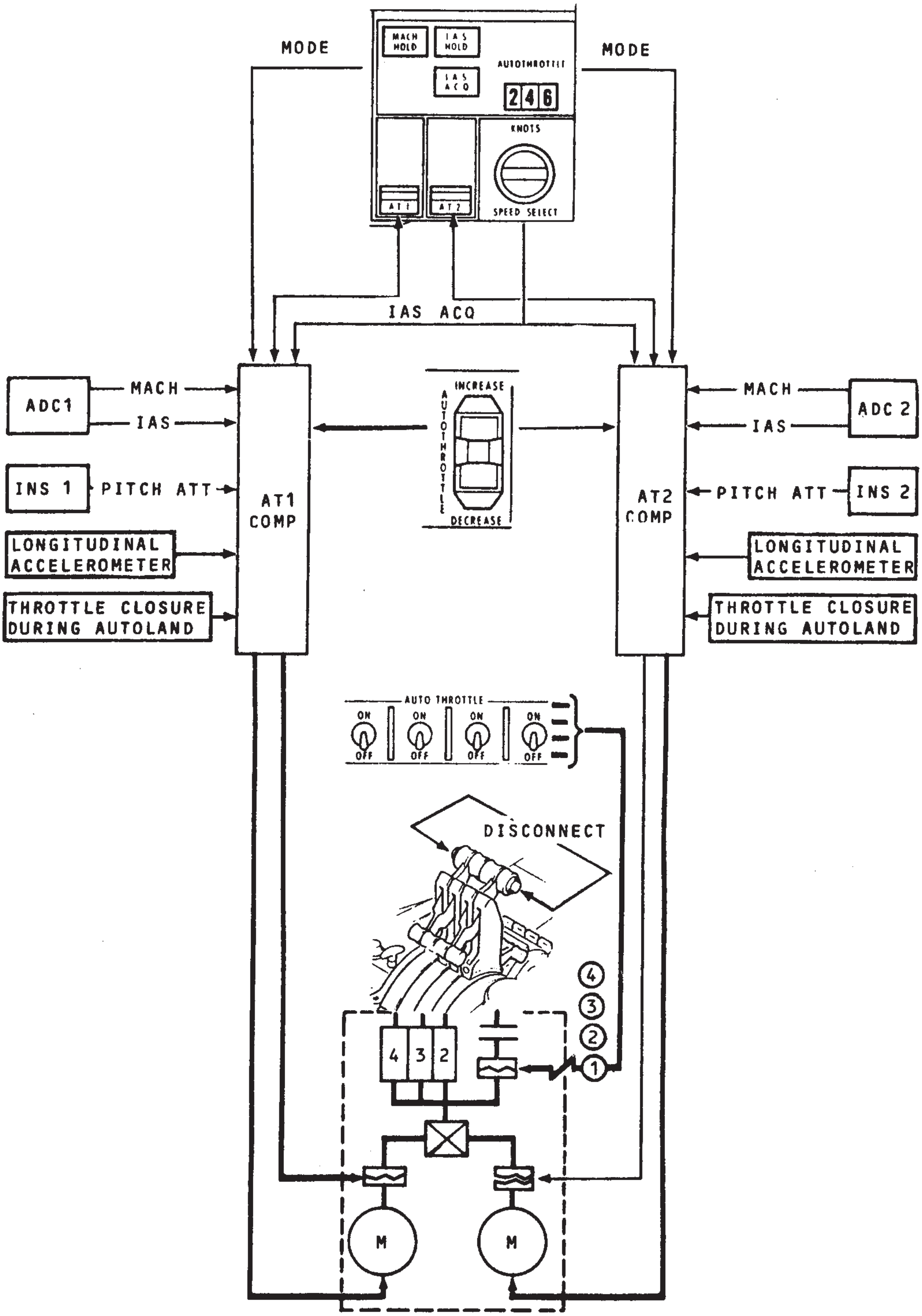
AUTOPILOT/FLIGHT DIRECTOR (NO.1)



* NOT REQUIRED FOR FLIGHT DIRECTOR

(Unchanged)

AUTOTHROTTLE



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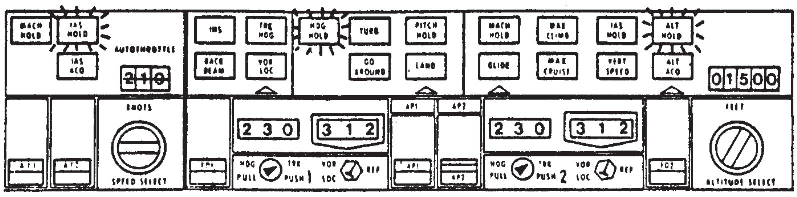
AUTOMATIC LANDING PHASES
(Sheet 1 of 2)

①

INITIAL CONFIGURATION

1.1. HEADING HOLD

1.2 ALTITUDE HOLD

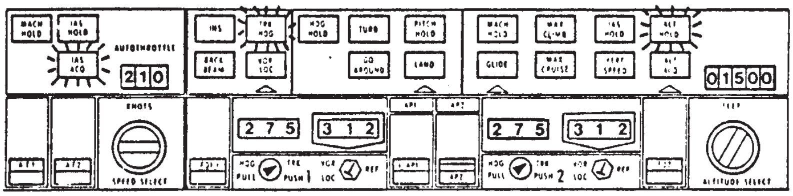


②

2.1 SELECT INTERCEPTION HEADING AND RUNWAY HEADING ON BOTH TRK AND COURSE SET POINTERS FOR BOTH SYSTEMS

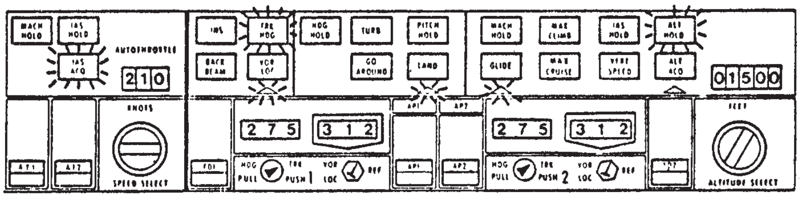
2.2 SELECT SPEED

2.3 ENGAGED IAS ACQ



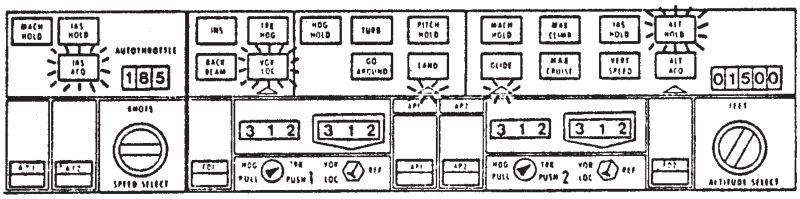
2.4 DEPRESS LAND MODE

2.5 ENGAGE AP2



③

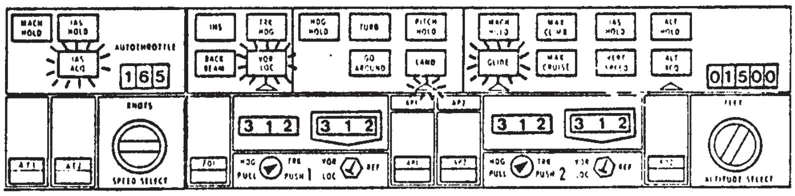
- LOCALIZER CAPTURE



④

- GLIDE CAPTURE

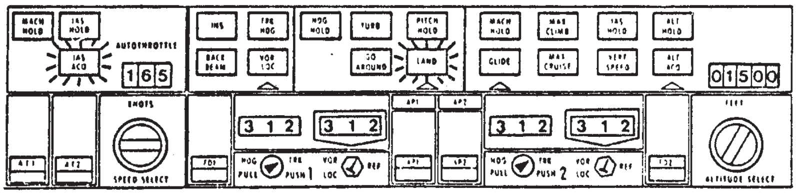
DIAL BACK TO APPROACH SPEED AT ONE DOT GLIDE SLOPE DEVIATION



⑤

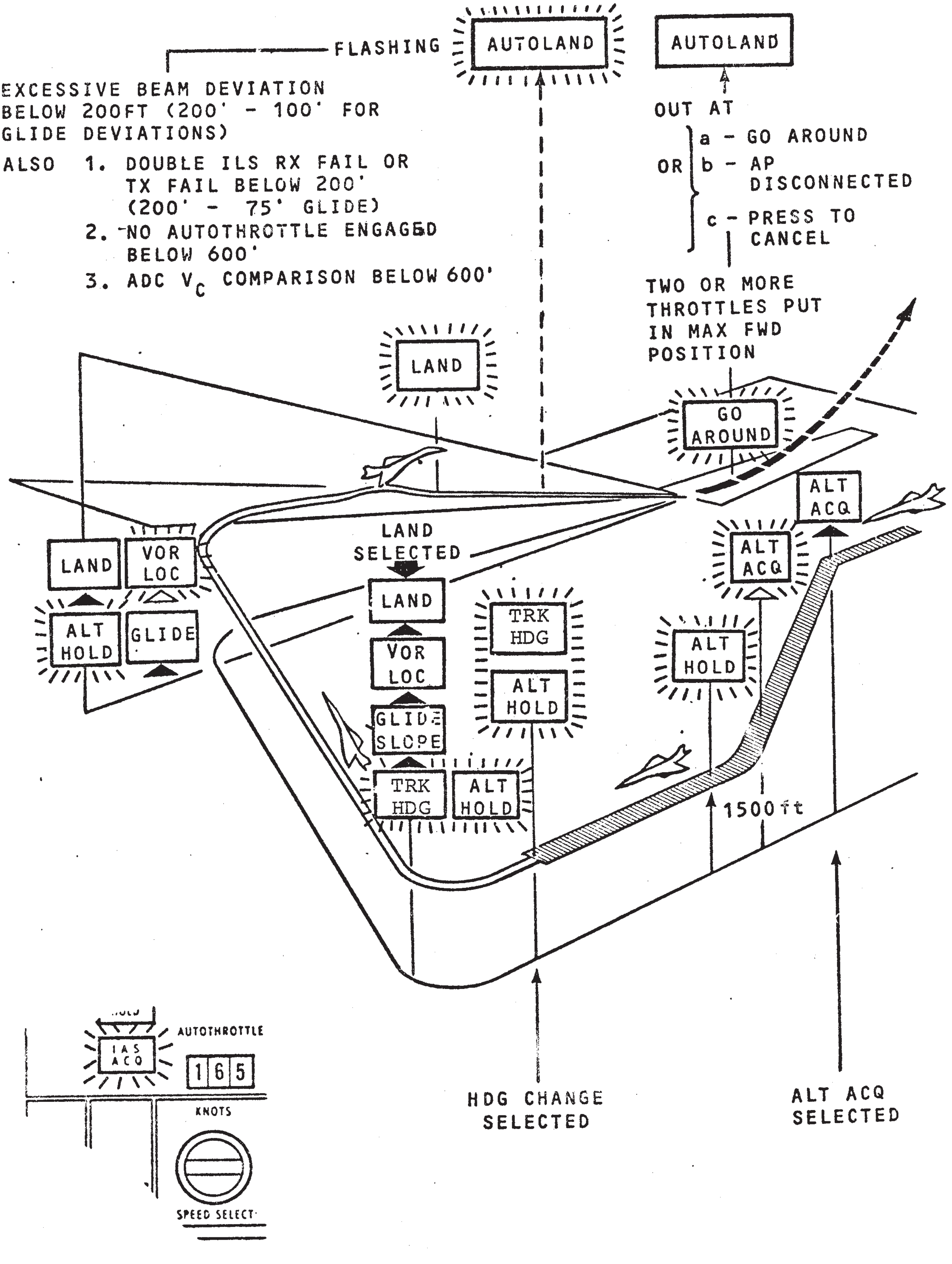
- LAND ENGAGED

NOTE: USUALLY INSTANTANEOUS WITH ④



PRINTE ENGLAND

AUTOMATIC LANDING PHASES



FLASHING

EXCESSIVE BEAM DEVIATION BELOW 200FT (200' - 100' FOR GLIDE DEVIATIONS)

ALSO
1. DOUBLE ILS RX FAIL OR TX FAIL BELOW 200' (200' - 75' GLIDE)
2. NO AUTOTHROTTLE ENGAGED BELOW 600'
3. ADC V_C COMPARISON BELOW 600'

OUT AT

OR
a - GO AROUND
b - AP DISCONNECTED
c - PRESS TO CANCEL

TWO OR MORE THROTTLES PUT IN MAX FWD POSITION

LAND SELECTED

HDG CHANGE SELECTED

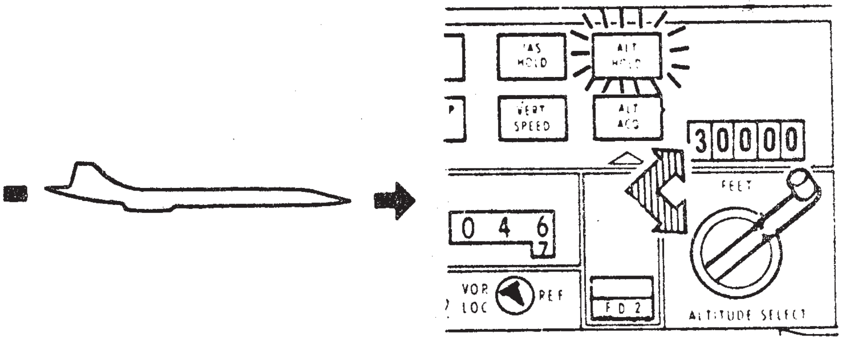
ALT ACQ SELECTED

(Completely Revised)

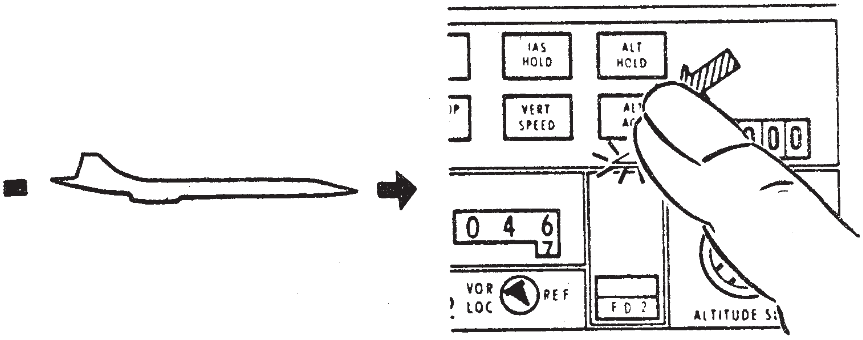
ALTITUDE ACQUIRE - VISUAL INDICATION

1 - BEFORE CHANGE OF ALTITUDE

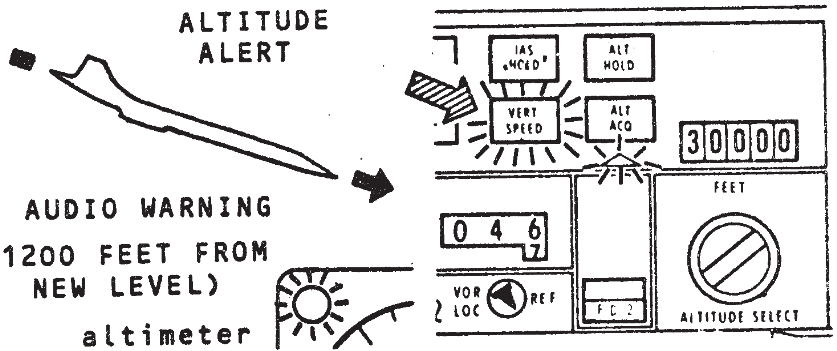
1-1 - SELECT NEW FLIGHT LEVEL



1-2 - "ALT ACQ" MODE (PRIME) ENGAGEMENT



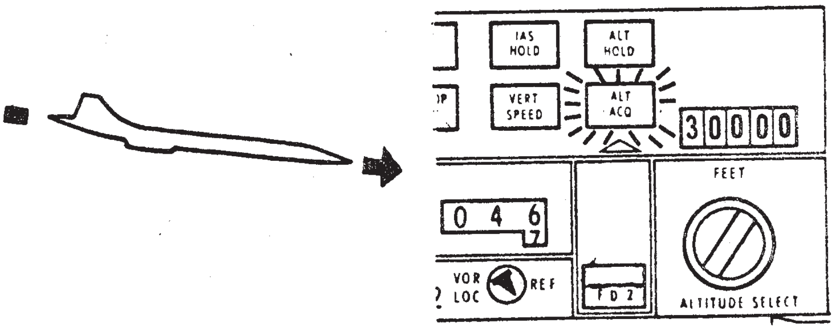
2 - AT 800FT/MIN VERT SPEED AUTOMATICALLY ENGAGED


ALTITUDE ALERT

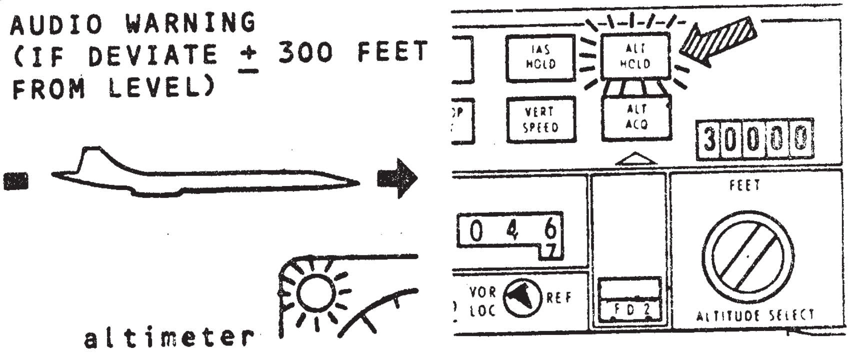
AUDIO WARNING
(1200 FEET FROM NEW LEVEL)

3 - ACTUAL ACQUIREMENT

AT CAPTURE LEVEL

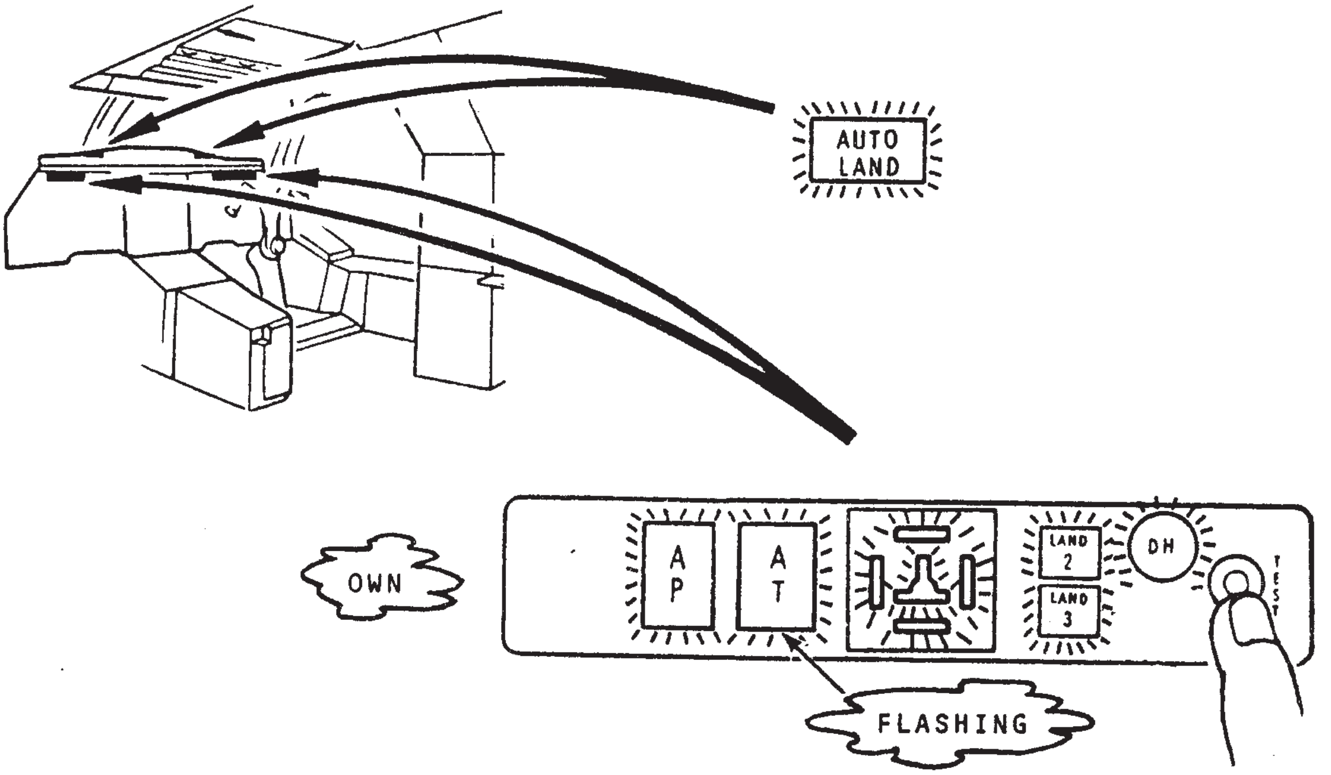


3-2 - AT NEW LEVEL


AUDIO WARNING
(IF DEVIATE ± 300 FEET FROM LEVEL)

(Unchanged)

LANDING DISPLAY TEST



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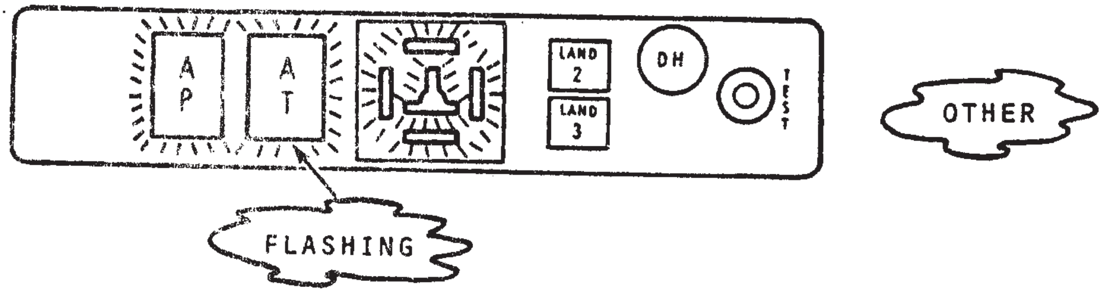
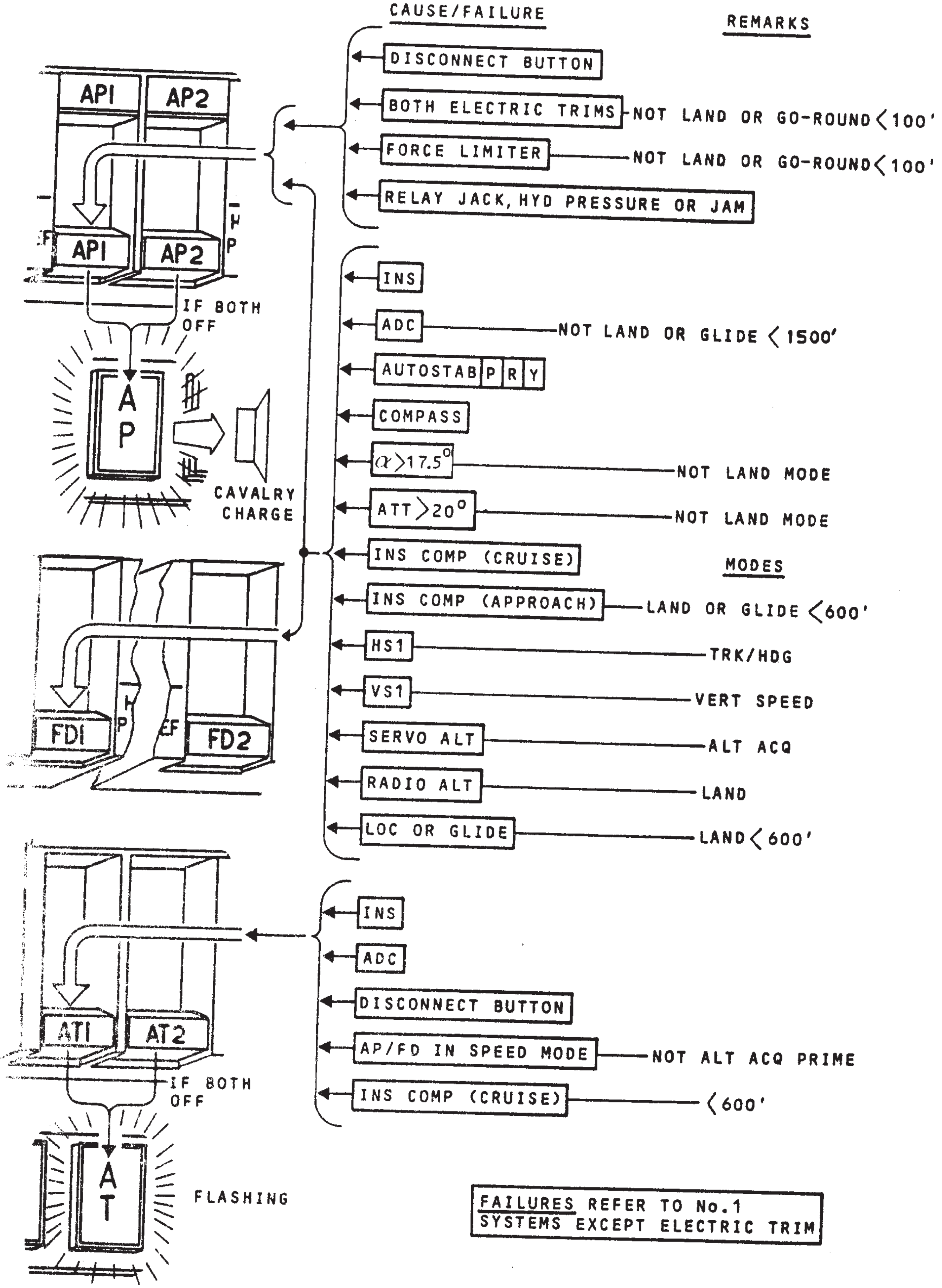


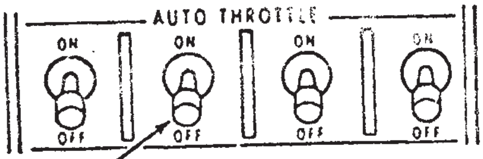
NO.1 AFCS DISCONNECTS

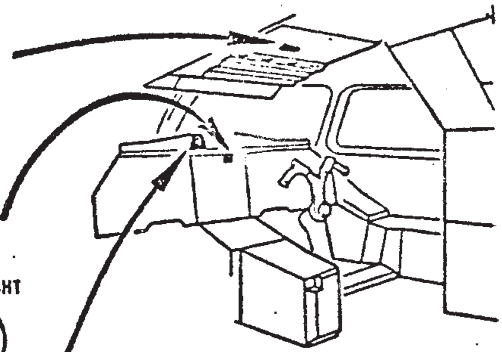


CAUSE/FAILURE	REMARKS
DISCONNECT BUTTON	
BOTH ELECTRIC TRIMS	NOT LAND OR GO-ROUND < 100'
FORCE LIMITER	NOT LAND OR GO-ROUND < 100'
RELAY JACK, HYD PRESSURE OR JAM	
INS	
ADC	NOT LAND OR GLIDE < 1500'
AUTOSTAB P R Y	
COMPASS	
$\alpha > 17.5^\circ$	NOT LAND MODE
ATT $> 20^\circ$	NOT LAND MODE
INS COMP (CRUISE)	MODES
INS COMP (APPROACH)	LAND OR GLIDE < 600'
HS1	TRK/HDG
VS1	VERT SPEED
SERVO ALT	ALT ACQ
RADIO ALT	LAND
LOC OR GLIDE	LAND < 600'
INS	
ADC	
DISCONNECT BUTTON	
AP/FD IN SPEED MODE	NOT ALT ACQ PRIME
INS COMP (CRUISE)	< 600'

FAILURES REFER TO No.1 SYSTEMS EXCEPT ELECTRIC TRIM

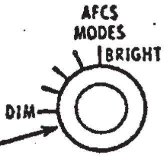
AUTOTHROTTLE





AUTOTHROTTLE MASTER SWITCHES

ON - connects the associated engine to the autothrottle system.



AFCS MODES LIGHTING ROTARY SELECTOR

Permits DIM to bright AFCS modes. Even with the minimum setting on the rotary selector the modes push button lights are illuminated on the AFCS panel.

IAS HOLD PUSH BUTTON LIGHT (White)

Pressed - holds the existing airspeed.
On - indicates engagement of the mode.

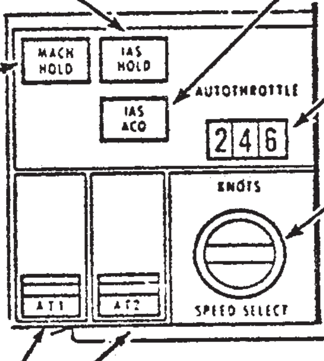
IAS HOLD is the basic autothrottle mode and is engaged when autothrottle is selected.

MACH HOLD PUSH BUTTON LIGHT (White)

Pressed - hold the existing Mach No.
On - indicates engagement of the mode
OR
On (one filament only) - indicates, when autopilot is engaged in MAX CRUISE, that the autothrottle is intervening to prevent an overspeed situation developing.

IAS ACQ PUSH BUTTON LIGHT (White)

Pressed - initiates the acquisition and subsequent hold of speed set on the SPEED SELECT.
On - indicates engagement of the mode.



SPEED SETTING INDICATOR

SPEED SELECT CONTROL

For autothrottle IAS ACQ Mode, speed datum range available is 130-400 kt
Knob detent feel at 1 kt. increments, one revolution changes index by 20 kt.

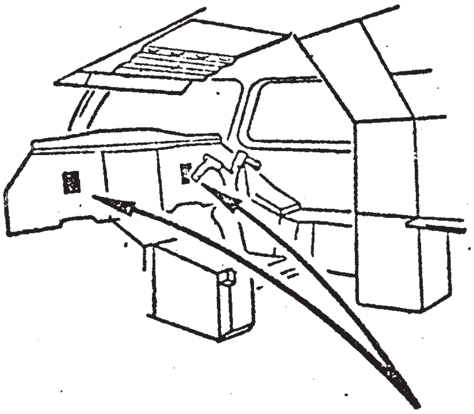
AUTOTHROTTLE SWITCHES

The engage switch for each AT channel is solenoid held in the engage position only when the associated channel has been satisfactorily engaged, or when satisfactorily primed or when the autopilot is in the ALT ACQ mode or MAX CLIMB or MAX CRUISE mode. Thus the position of the switch always indicates the engagement state of the channel.

Normally both autothrottle switches are engaged except when an autothrottle is engaged with the autopilot in MAX CLIMB or MAX CRUISE mode. In this case autothrottle 1 must be engaged with autopilot 1 or autothrottle 2 with autopilot 2. The disengagement of both autothrottle systems is accompanied by the AT light (red) flashing on both landing displays and, if the aircraft is below 600 ft in LAND or GLIDE mode, AUTOLAND lights (red) flashing on both dash panels.

(Completely Revised)

ATTITUDE DIRECTOR INDICATOR



GROUND ROLL GUIDANCE

Provides guidance commands from the selected Flight Director.
In view only after touchdown or autopilot disconnection with flight director in LAND mode and radio altimeter height below 100 ft.

PITCH INDEX

Preset by rotary selector on the control columns.

DH LIGHT (Amber).

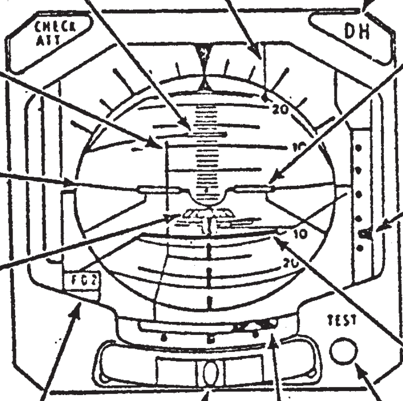
On - indicates that the aircraft is at or below the decision height set into either radio altimeter.

ROLL COMMAND BAR

Provides roll guidance commands from the selected Flight Director.

FIXED AIRCRAFT SYMBOL

Shows the position of the aircraft in relation to the horizon index.



HORIZON INDEX

Provides the horizon position reference related to the fixed aircraft symbol.

GLIDE SLOPE POINTER

Shows vertical position relative to glide slope - 2 dots represent half a degree.
The pointer is out of view when ILS frequency is not selected.

RISING RUNWAY

Shows the radio altimeter height, it appears as soon as the associated radio altimeter reads 200 ft.
The No.1 radio altimeter feeds the First Officer's ADI and vice versa.

PITCH COMMAND BAR

Provides pitch guidance commands from the selected Flight Director.

SLIP INDICATOR

TEST PUSH BUTTON

Pressed - tests the ADI functioning, the operation of the failure flag G and the CHECK ATT lights.

FLIGHT DIRECTOR SOURCE

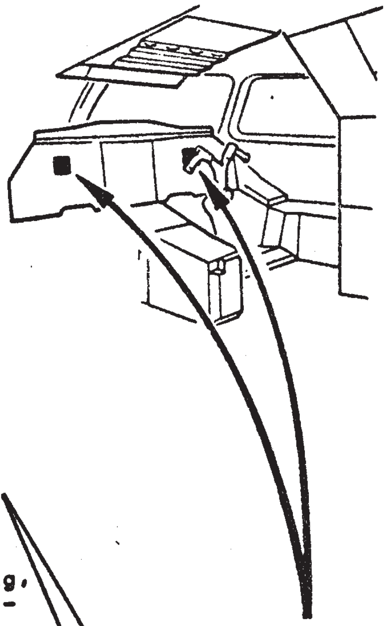
Shows which Flight Director is providing command bar information.

LOCALISER INDEX

Shows lateral position relative to the localiser.

(Completely Revised)

ATTITUDE DIRECTOR INDICATOR (Sheet 2 of 2)



CHECK ATT LIGHT (Amber) AND PLATFORM FLAG
(Black G on a red background)

G - indicates either an ADI internal failure or selected INS attitude failure.

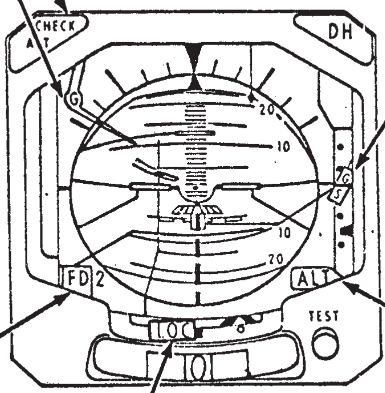
If three INSs are operating, the G flag may be accompanied by the CHECK ATT light (amber) on both ADIs and by tilt to 90 degrees dive of the faulty ADI drum.

If only two INSs are operating the G flag may be accompanied by the CHECK ATT light (amber) on both ADIs.

If the warning is due to an INS attitude failure, the associated autopilot, flight director and autothrottle will disengage.

GLIDE SLOPE FLAG
(Black G/S on a red background)

G/S - indicates that the glide slope is not valid.
Accompanied by the disappearance of the glide slope pointer.



FLIGHT DIRECTOR FLAG
(Black FD on a red background)

FD - indicates failure of the selected flight director.
Accompanied by the disappearance of the pitch and roll command bars.

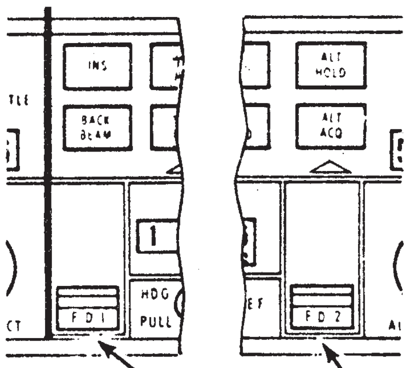
LOCALISER FLAG
(Black LOC on a red background)

LOC - indicates that the localiser data is not valid.
Accompanied by the disappearance of the localiser index.

RADIO ALTIMETER FLAG
(Black ALT on a red background)

ALT - indicates that the associated radio altimeter data is not valid.
Accompanied by the disappearance of the rising runway symbol.

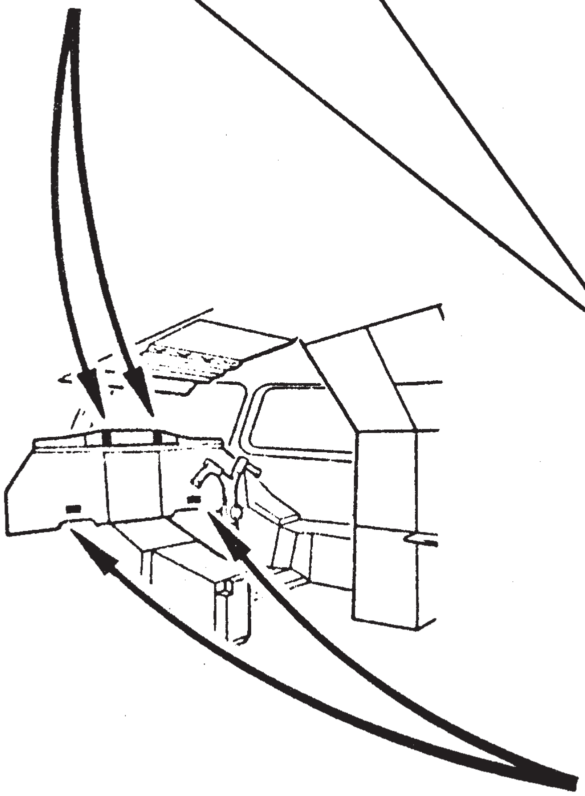
FLIGHT DIRECTOR SWITCHES



The basic Flight Director engagement mode is PITCH HOLD and will be engaged on selection of a Flight Director if no autopilot is engaged.

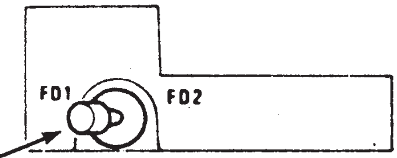
If a Flight Director is engaged when an auto-pilot is already engaged the Flight Director will assume the established mode.

If PITCH HOLD is engaged on the auto-pilot the Pitch Command bar will be biased out of view.



FLIGHT DIRECTOR SWITCH

The engage switch for each Flight Director is solenoid held in the engage position only when the associated channel has been satisfactorily engaged. Thus the position of the switch always indicates the engagement state of the channel.

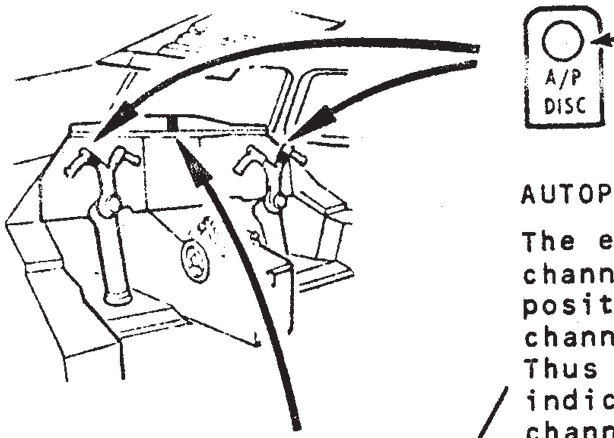


CAPTAIN'S AND FIRST OFFICER'S
FD1/FD2 SWITCH

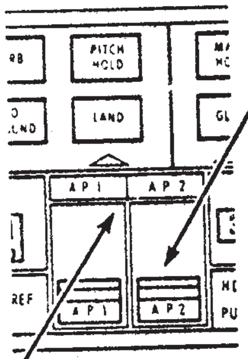
FD1 - the data display on the associated ADI is obtained from Flight Director computer No.1.

FD2 - the data display on the associated ADI is obtained from Flight Director computer No.2.
It is possible to supply both ADI's from the same Flight Director computer, but the system will not allow cross coupling i.e. the captain's ADI on FD2 and the first officer's ADI on FD1, although switch positioning is possible.

AUTOPILOT SWITCHES



AUTOPILOT DISCONNECT BUTTON



AUTOPILOT SWITCHES

The engage switch for each autopilot channel is solenoid held in the engage position only when the associated channel has been satisfactorily engaged. Thus the position of the switch always indicates the engagement state of the channel.

The successful engagement requires the following; successful internal monitoring of the autopilot system, no excess incidence or attitude warnings and healthy operation of the associated INS and compass coupler, all three axes of the associated autostabilization system, either electric trim channel and the associated ADC.

At engagement the autopilot maintains the pitch attitude and engaged heading. Should the aircraft not be in a wings level condition upon engagement, automatic wings levelling and attainment of the engaged heading will be initiated.

Only one autopilot may be engaged except with LAND mode selected, when engagement of both autopilot channels is possible.

The loss of autopilot control is accompanied by the AP light (red) on both landing displays, accompanied by an audio (cavalry charge).

AP1 AND AP2 LIGHTS (Green)

On - indicates engagement of the associated autopilot channel.

NOTES

If engagement of an autopilot channel is attempted when a Flight Director is already engaged the system will return to the basic autopilot modes irrespective of the previously established mode associated with the Flight Director, except after LAND mode is selected when the autopilot will also engage in LAND mode. If the Flight Director is engaged in GO-AROUND mode autopilot engagement causes reversion to basic mode.

If an autopilot is engaged when the autothrottle is already engaged and a non-compatible mode is selected on the autopilot, both channels of the autothrottle will disengage. If an autothrottle is engaged when the autopilot is engaged in a non-compatible mode the autopilot reverts to basic modes.

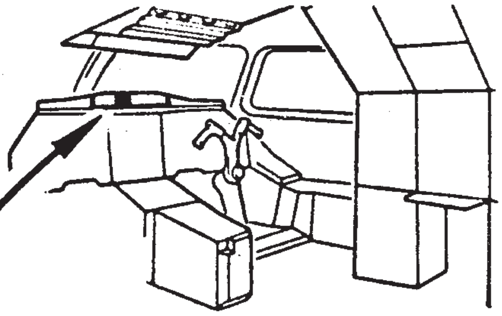
Engagement of an autopilot inhibits the pilot control of electric trim and auto-trim is automatically engaged thus ensuring that the aircraft is in a trimmed condition when the autopilot is disengaged.

AUTOFLIGHT MODES (Sheet 1 of 4)

INS PUSH BUTTON LIGHT (White)

Pressed - initiates the acquisition and subsequent hold of the track between two way points set in the INS.
On - indicates engagement of the mode.

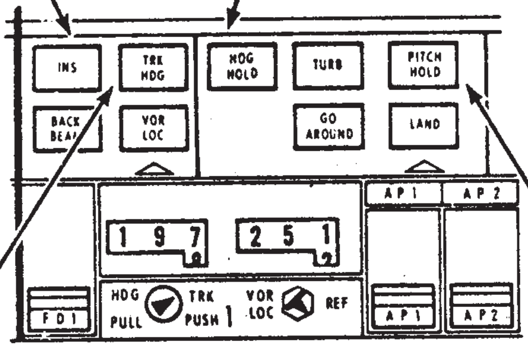
During the acquisition the aircraft will roll at a rate of 2.5 degrees per second to a maximum bank angle of 30 degrees in subsonic flight and 20 degrees in supersonic flight.



HDG HOLD PUSH BUTTON LIGHT (White)

Pressed - holds the existing magnetic heading.
On - indicates engagement of the mode.

HDG HOLD is a basic autopilot mode and is engaged when autopilot is selected.



TRK HDG PUSH BUTTON LIGHT (White)

Pressed - initiates the acquisition and subsequent hold of the preselected track or heading using a bank angle not greater than 30 degrees.

On - indicates engagement of the mode.

Providing the change in TRK HDG is not greater than 200 degrees the aircraft will turn on to the preselected TRK HDG in the sense used to select the TRK HDG.

PITCH HOLD PUSH BUTTON LIGHT (White)

Pressed - holds the existing attitude
On - indicates engagement of the mode.

PITCH HOLD is a basic autopilot mode and is engaged when autopilot is selected.

If an incompatible autothrottle mode is selected the autopilot will revert to this basic mode.

AUTOFLIGHT MODES (Sheet 2 of 4)

TURB PUSH BUTTON LIGHT (White)

Pressed - holds the existing pitch attitude and heading and reduces the trim rate of the electric trim system.

TURB mode is specific to the autopilot.

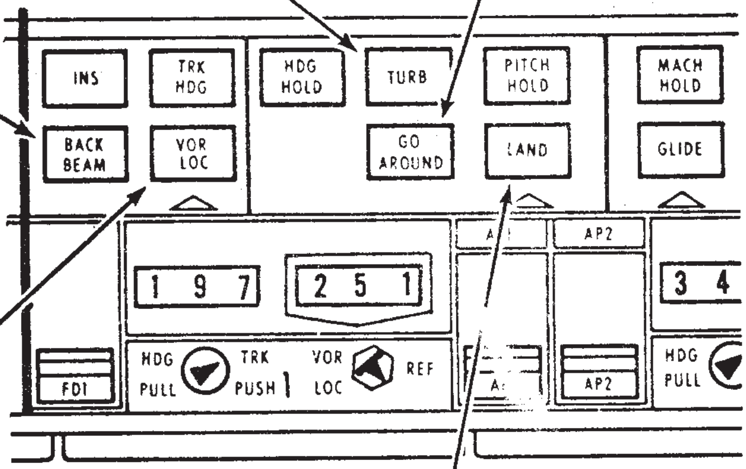
BACK BEAM PUSH BUTTON LIGHT (White)

This mode is specific to the flight director and can only be used with the autopilot disengaged

Pressed - permits capture and tracking of a BACK BEAM LOC.

GO-AROUND LIGHT (White)

On - indicates that automatic go-around has been initiated. Automatic go-around is initiated if at least two throttle levers are pushed fully forward with the autopilot engaged in LAND or GLIDE mode and autothrottles disengaged. If an autopilot and flight director are engaged the autopilot will pitch the aircraft 15° up and hold wings level and the ADI will show the appropriate command signals.
The mode is disengaged by disengagement of the auto-pilot or selection of HDG HOLD.



VOR LOC PUSH BUTTON LIGHT (White)

Pressed - initiates the acquisition and subsequent hold of the selected VOR radial (or LOC).
On - indicates successful capture of the radial.

During the acquisition the prime light is on (white)

NOTE: During transition of the cone of confusion the autopilot and Flight Director maintain heading.

LAND PUSH BUTTON LIGHT (White)

Pressed - primes both the VOR LOC and GLIDE modes.
On - indicates successful capture of the LOC beam and GLIDE beam in LAND mode.

Before acquisition the prime light (white) is on accompanied by VOR LOC prime (white) and GLIDE prime light (white).

After LAND mode is selected the second autopilot can be engaged.

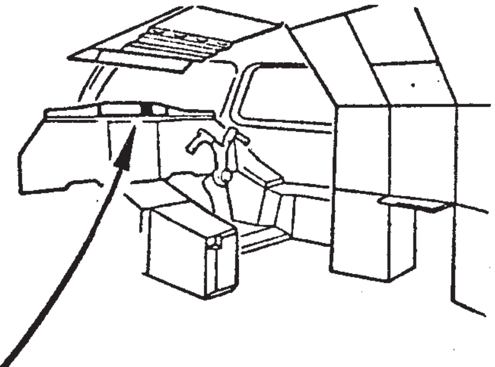
AUTOFLIGHT MODES

GLIDE PUSH BUTTON LIGHT (White)

Pressed - primes both GLIDE and LOC modes
On - indicates successful capture of the GLIDE beam; successful capture of the LOC beam is indicated by the VOR/LOC light on.

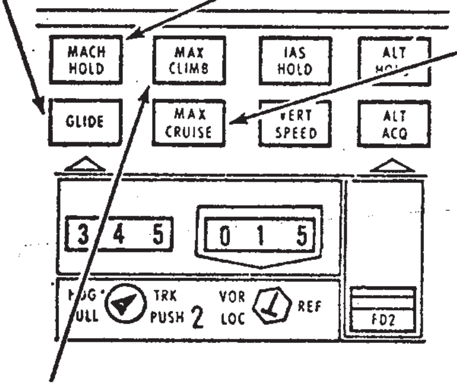
Before acquisition the prime lights (white) of both GLIDE and VOR/LOC are on.

NOTE: Glide mode is intended for use on lower quality ILS beams down to CAT1 limits.
No automatic landing facility is available in this mode.



MACH HOLD PUSH BUTTON LIGHT (White)

Pressed - holds the existing Mach number.
On - indicates engagement of the mode.



MAX CLIMB PUSH BUTTON LIGHT (White)

Pressed - When at or near V_{MO} constrains the airspeed to V_{MO}. This mode is automatically disengaged at the "corner point" between 530 kts and M = 2.00 or when T_{MO} is reached.

On - indicates engagement of the mode.

NOTE

After the automatic engagement of MAX CRUISE the MAX CLIMB light stays on.

MAX CRUISE LIGHT (White)

On - indicates engagement of the mode.

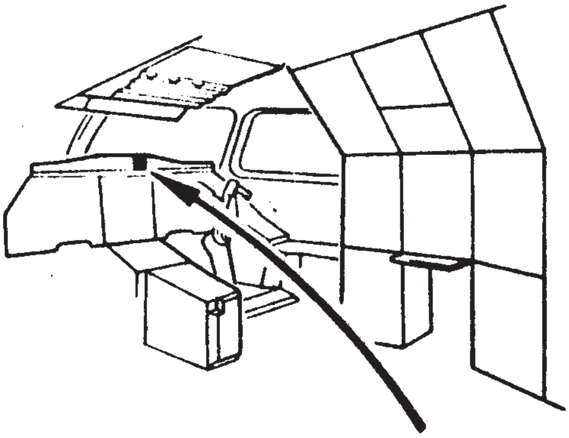
MAX CRUISE is automatically engaged from the MAX CLIMB mode when the "corner point" between 530 kts and M = 2.00 or T_{MO} is reached in a climb.
Once engaged it constrains the aircraft to the lesser of M = 2.00 or the airspeed associated with T_{MO}.
The MAX CRUISE mode is normally used with the associated autothrottle primed. In this case as the autopilot engages in MAX CRUISE mode the autothrottle will latch in MACH HOLD and remain latched for at least 100 seconds or longer as is necessary to guard against any tendancy to overspeed. The autothrottle will then revert to its primed condition and intervene only when an approaching overspeed is sensed.

MAX CRUISE will disengage and MAX CLIMB re-engage when the aircraft descends below the "corner point".

CAUTION
IN MAX CLIMB AND MAX CRUISE MODES COMBINED USE OF AUTOPILOT 1 WITH AUTOTHROTTLE 2 OR AUTOPILOT 2 WITH AUTOTHROTTLE 1 IS PROHIBITED BECAUSE SMALL DIFFERENCES BETWEEN THE OUTPUTS FROM ADC 1 AND ADC 2 MAY JEOPARDIZE THE PROPER SIMULTANEOUS FUNCTIONING OF THE AUTOPILOT AND AUTOTHROTTLE.

(Completely Revised)

AUTOFLIGHT MODES (Sheet 4 of 4)



ALT HOLD PUSH BUTTON LIGHT (White)

Pressed - holds the existing altitude.
On - indicates engagement of the mode.

IAS HOLD PUSH BUTTON LIGHT (White)

Pressed - holds the existing airspeed.
On - indicates engagement of the mode.

VERT SPEED PUSH BUTTON LIGHT (White)

Pressed - holds the existing vertical speed.
On - indicates engagement of the mode.

NOTE:
In the event of a VSI instrument failure the VERT SPEED mode of the associated autopilot will be inoperative.
An instrument failure while the VERT SPEED mode is engaged will cause a complete disengagement of the autopilot.

HDG PULL/TRK PUSH SELECTORS (2)

Selects heading or track on the corresponding HSI.

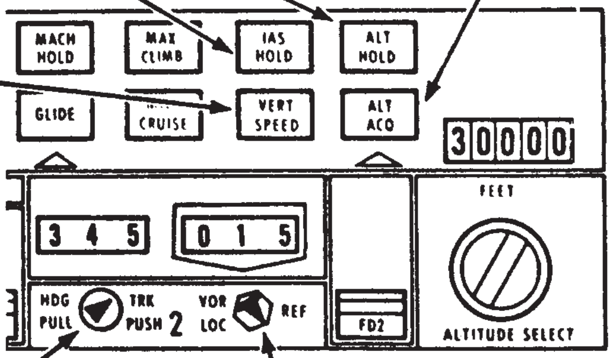
ALT ACQ PUSH BUTTON LIGHT (White)

Pressed - initiates the acquisition of the altitude set on the ALTITUDE SELECT.

Upon selection of ALT ACQ the prime light will come on and the aircraft will remain under the control of the previous mode except in the case of ALT HOLD when VERT SPEED is automatically engaged at 800 ft per min. to intercept the selected altitude. At the capture point, capture will be automatically initiated, this being indicated by the previous mode and the prime light going off and the ALT ACQ light coming on. At the selected altitude the ALT ACQ light will go off and the ALT HOLD light will come on.

NOTE: If at the capture point an autothrottle is not engaged the AT light (red) will flash continuously on both landing situation displays.

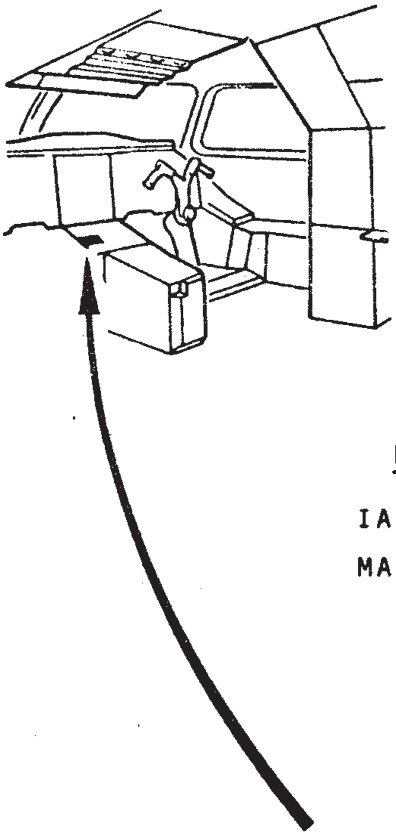
NOTE: If, during capture, altitude is reselected, pitch hold is engaged until the new capture point is reached.
If selected altitude passes through the present altitude. ALT HOLD is engaged at that level.



VOR LOC SELECTORS (2)

Selects VOR LOC course on the corresponding HSI.

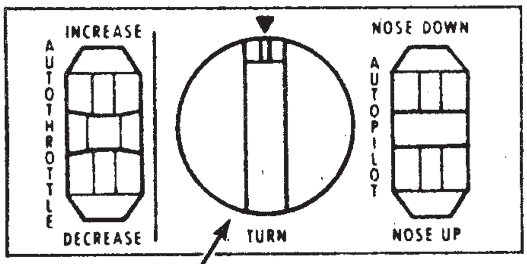
AUTOTHROTTLE DATUM ADJUST AND AUTOPILOT TURN CONTROLS



AUTOTHROTTLE DATUM ADJUST

The autothrottle datum adjust is a spring return to centre selector The function of the selector is dependent on the speed mode in control.

MODE	PARAMETER/RANGE	ADJUSTMENT
IAS HOLD	Airspeed ± 22 kt	2 kt/sec
MACH HOLD	Mach No ± 0.06 M	0.006 M/sec



AUTOPILOT TURN KNOB

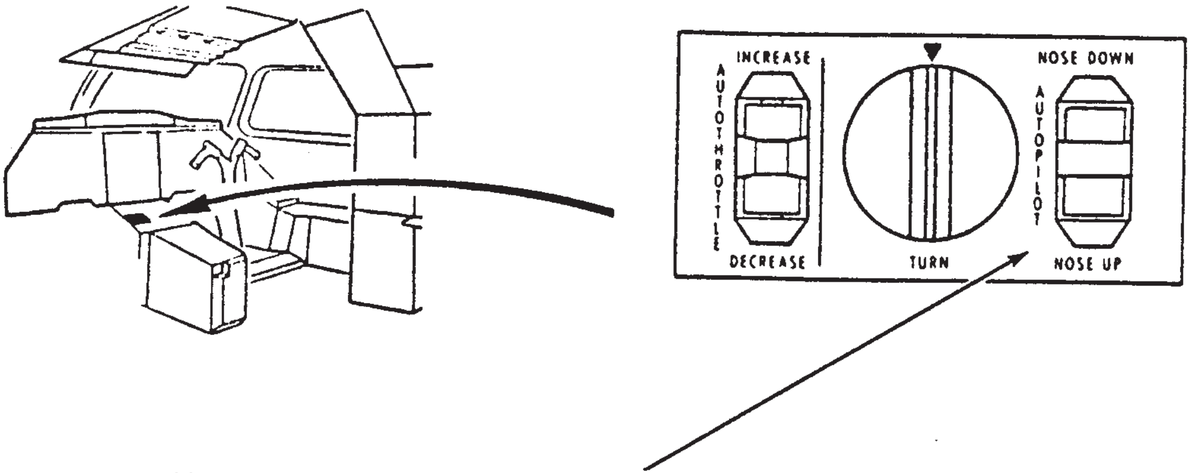
In HDG/HOLD the TURN knob will demand a bank angle, at a roll rate of 5 degrees per second, proportional to the amount of movement of the knob but not exceeding 35 degrees.

Use of the TURN knob will cause reversion to the autopilot basic heading mode.
The TURN knob must then be returned to the centre detent position before any further heading mode selection will engage.
The TURN knob is inoperative with LAND selected.

NOTE: The TURN knob must be in its centre detent position before autopilot engagement is attempted.

(Unchanged)

AUTOPILOT DATUM ADJUST CONTROL



AUTOPILOT PITCH DATUM ADJUST

The autopilot pitch datum adjust is a spring return to centre selector with two pressures in each direction. The function of the selector is dependent on the pitch mode in control

MODE	PARAMETER/RANGE	SLOW ADJUSTMENT	FAST ADJUSTMENT
PITCH HOLD	* Acceleration	0.05 g	0.15 g
ALT HOLD	Altitude ± 600 ft	20 ft/sec	60 ft/sec
IAS HOLD	Airspeed ± 20 kt	0.7 kt/sec	2.0 kt/sec
MACH HOLD	Mach No. ± 0.06 M	0.002 M/sec	0.007 M/sec
MAX CLIMB	† Airspeed ± 17.3 kt	0.7 kt/sec	2.0 kt/sec
VERTICAL SPEED	Vertical speed ± 6000 ft/min	80 ft/min/sec	800 ft/min/sec

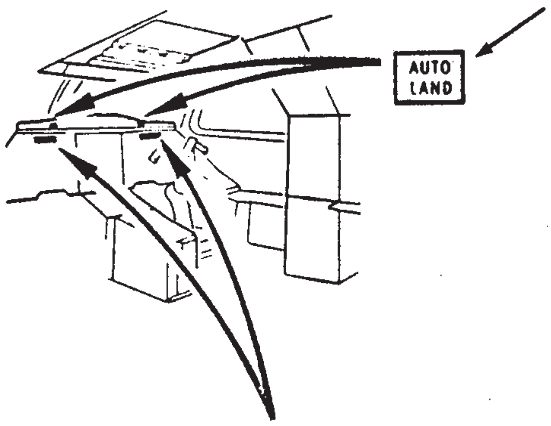
* The normal acceleration demand is a step value irrespective of aircraft speed. The aircraft attitude will be maintained to that existing at the time the switch is released to the centre position.

† In MAX CLIMB mode the pitch datum adjust will operate but at the automatic engagement of MAX CRUISE mode any shift is automatically zeroed.
In MAX CRUISE mode the pitch datum adjust is inhibited.

NOTE

With only the Flight Director engaged the autopilot datum adjust zeroes the ADI pitch command bar and synchronises the clutches in the hold modes except in the case of MAX CLIMB and VERT SPEED modes where operation injects an offset into the control term.

WARNING AND LANDING DISPLAY (Sheet 1 of 3)



AUTOLAND LIGHT (Red) (2)

On - flashing - indicates:-
In LAND or GLIDE mode an ADC airspeed comparator warning or loss of both autothrottles below 600 ft

or

in LAND or GLIDE mode an ILS transmitter or double receiver failure below 200 ft for LOC or between 200 and 75 ft for GLIDE

or

in LAND mode an excessive ILS deviation below 200 feet for LOC or between 200 and 100 feet for GLIDE.

AT LIGHT (Red)

Flashing - Indicates total loss of autothrottle control.

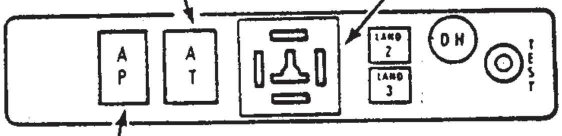
or

if, in autopilot/flight director ALT ACQ mode the autothrottle is not engaged at capture initiation.

or

If, in autopilot/flight director LAND or GLIDE mode the autothrottle is not engaged at glide capture initiation.

The AT light may be cancelled by operation of the AT instinctive disconnect push button.



AP LIGHT (Red)

On - indicates total loss of autopilot control.
Accompanied by an audio (cavalry charge)

The AP light may be cancelled by operation of the AP instinctive disconnect push button.

AIRCRAFT DEVIATION LIGHTS

Associated with the autopilot and/or flight director in the approach modes.

AIRCRAFT SYMBOL LIGHT (Amber)

On - accompanied by left vertical light (White) - indicates that the aircraft has deviated 1/4 dot to the right of the LOC centre line

or

accompanied by right vertical light (White) - indicates that the aircraft has deviated 1/4 dot to the left of the LOC centre line

or

accompanied by upper horizontal light (White) - indicates that the aircraft has deviated one dot below the glide slope.

or

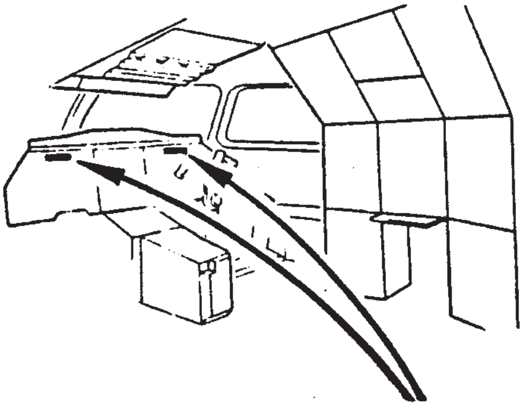
accompanied by lower horizontal light (White) - indicates that the aircraft has deviated one dot above the glide slope.

NOTE: Below 100 ft the glide slope deviation warning is inhibited.

NOTE: Below 200 ft in the LAND mode a localiser or glide deviation warning will be accompanied by the AUTOLAND lights (red) flashing.

(Deletion)

WARNING AND LANDING DISPLAY (Sheet 2 of 3)



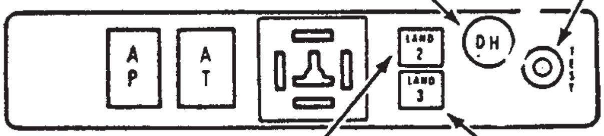
DH LIGHT (Amber)

On - indicates that the aircraft is at or below the decision height set into the associated radio altimeter.

NOTE: The DH light is independent of autopilot/flight director engagement.

TEST PUSH BUTTON

Pressed - tests all the filaments of the Warning and Landing Display and most of the associated logic and excessive deviation thresholds inside the associated computer.



LAND 2 LIGHT (Green)

Associated with the autopilot in LAND mode.
On-indicates that the capability of the system is that of an automatic landing in category 2 conditions.
Land 2 capability requires:
Flight controls in an electrical mode.
One autopilot engaged in LAND mode.
The flare law test successful.
At least one landing display serviceable.
At least one autothrottle engaged in IAS ACQ mode.

NOTE: Below the alert height the capability indications are latched on except in the event of loss of both autopilots.

LAND 3 LIGHT (Green)

Associated with the autopilot in LAND mode.
On - indicates that the capability of the system is that of an automatic landing in category 3 conditions.
Land 3 capability requires:
Flight controls in an electrical mode.
Two autopilots engaged in LAND mode.
The flare law tests successful.
At least one landing display serviceable.
At least one autothrottle engaged in IAS ACQ mode.
At least one flight director engaged.
Two ADCs serviceable.
INS 3 serviceable.
INS comparator serviceable.
Green/yellow hydraulic system pressure correct.
Both AFCS VOR LOC selectors at the same course.
Electrical generation split.

NOTE: Below the alert height the capability indications are latched on except in the event of loss of both autopilots.

WARNING AND LANDING DISPLAY (Sheet 3 of 3)

EQUIPMENT FAILURES

The AIRCRAFT DEVIATION lights are also used, with the autopilot and/or flight director in the approach modes, to diagnose faults in the ILS equipment.

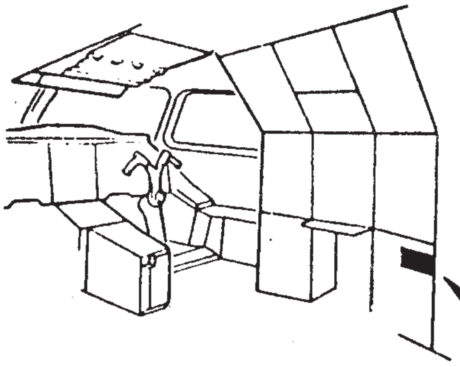
Localiser receiver failure -	flashing vertical lights (white) and aircraft symbol light (amber) if the associated autopilot is engaged and LOC flag visible on ADI whichever autopilot is engaged.
Localiser transmitter failure -	Flashing vertical lights (white) LOC flags visible on both ADIs.
Glide slope receiver failure -	flashing horizontal lights (white) and aircraft symbol light (amber) if the associated autopilot is engaged and G/S flag visible on ADI whichever autopilot is engaged.
Glide slope transmitter failure -	Flashing horizontal lights (white) G/S flags visible on both ADIs.

NOTE

Below 600 feet a single glide slope or localiser failure will disconnect the associated autopilot and withdraw the associated flight director bar. Above 600 feet the associated autopilot signal is zeroed and the aircraft will continue on the flight path immediately preceding the failure. The associated flight director bar is withdrawn. A Localiser transmitter failure or a Glide Slope transmitter failure does not disconnect the autopilot, the input signal to each autopilot is zeroed and each flight director bar withdrawn from view.
Below 200 feet a double glide slope or localiser receiver failure will bring on the AUTOLAND light.

(Unchanged)

IN-FLIGHT MONITOR



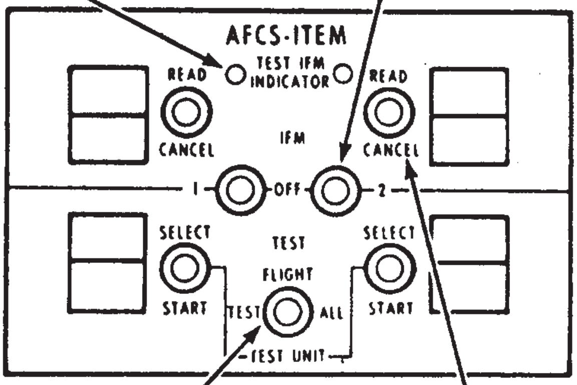
IFM SELECTORS (2)

IFM - providing the TEST selector is at FLIGHT an autotest routine is initiated in the associated channel.
After successful completion of the test, all indicators are off and the in-flight monitor is active. Failures are memorised only after the aircraft becomes airborne.

OFF - both the monitoring and test functions are inhibited, however the memory retains all information previously stored.

TEST IFM INDICATOR PUSH BUTTON (2)

Pressed and held - tests the associated IFM indication display.



READ - CANCEL SELECTORS

READ - the failure indications held in the permanent memory are displayed, each one for 2.5 secs followed by a quiescent period of 0.5 secs.

CANCEL - the indication displayed and the store in the permanent memory is cancelled.

TEST SELECTOR

FLIGHT - providing the IFM selector is at IFM a continuous monitoring of the AFCS engagement and interlock status takes place.
All indications are stored and retained in a memory that permits subsequent recall by ground crew even after a power shutdown on the ground.
The memory function is inhibited while the aircraft is on the ground.

Chapter 4

AUXILIARY POWER

Chapter 5

COMMUNICATIONS

COMMUNICATIONS

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- Selcal and Speaker Control 05.02.03
- Interphone and PA System 05.02.04
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- Audio Panels 05.03.03
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- ATC Transponder 05.03.05
- Boom/Mask Switch Panel 05.03.06

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GENERAL

The basic system comprises, VHF and HF communication equipment, SELCAL, ATC transponder, interphone systems service flight and cabin/galley, and passenger address. In addition a cockpit voice recorder is installed.

DESCRIPTION

VHF

Two separate identical VHF radio installations are fitted to provide communication in the 118-135.975 MHz frequency range with 25 kHz channel spacing.

HF

Two separate identical HF radio installations are fitted to provide single side band and amplitude modulated operation, giving two-way communication at 2182 kHz and in the band 2800 kHz to 25 MHz.

SELCAL

Selective calling (SELCAL) is used in conjunction with the aircraft's VHF and HF. SELCAL permits a ground station to call any particular aircraft without the need for pilots maintaining a continuous listening.

When the aircraft is called, a flashing light will tell the pilot on which communication channel he is required (two tone chime repeated every 5 seconds).

ATC TRANSPONDER

A duplicated ATC transponder system is provided. This secondary radar system enables a ground controller to identify an aircraft and determine its height.

AUDIO INTEGRATION

Each flight deck audio select panel provides integration of radio communications and radio navigation systems and the crew's interphone network.

FLIGHT INTERPHONE

The flight interphone system permits communication between the flight crew stations and between the flight crew stations and a ground crew station on the nose landing gear.

The flight interphone can under some circumstances be connected into the service interphone system.

SERVICE INTERPHONE

The service interphone system permits communication between the flight crew stations and the cabin crew stations, between cabin crew stations and cabin crew stations and between flight crew stations, cabin crew stations and ground stations throughout the aircraft.

PUBLIC ADDRESS

The public address system broadcasts to the passenger cabin from the flight deck or from any of the three cabin crew stations. A tape reproducer can be connected to the public address system to provide routine announcements, emergency announcements (manually selected or automatically when the emergency oxygen drop-out system operates) and music.

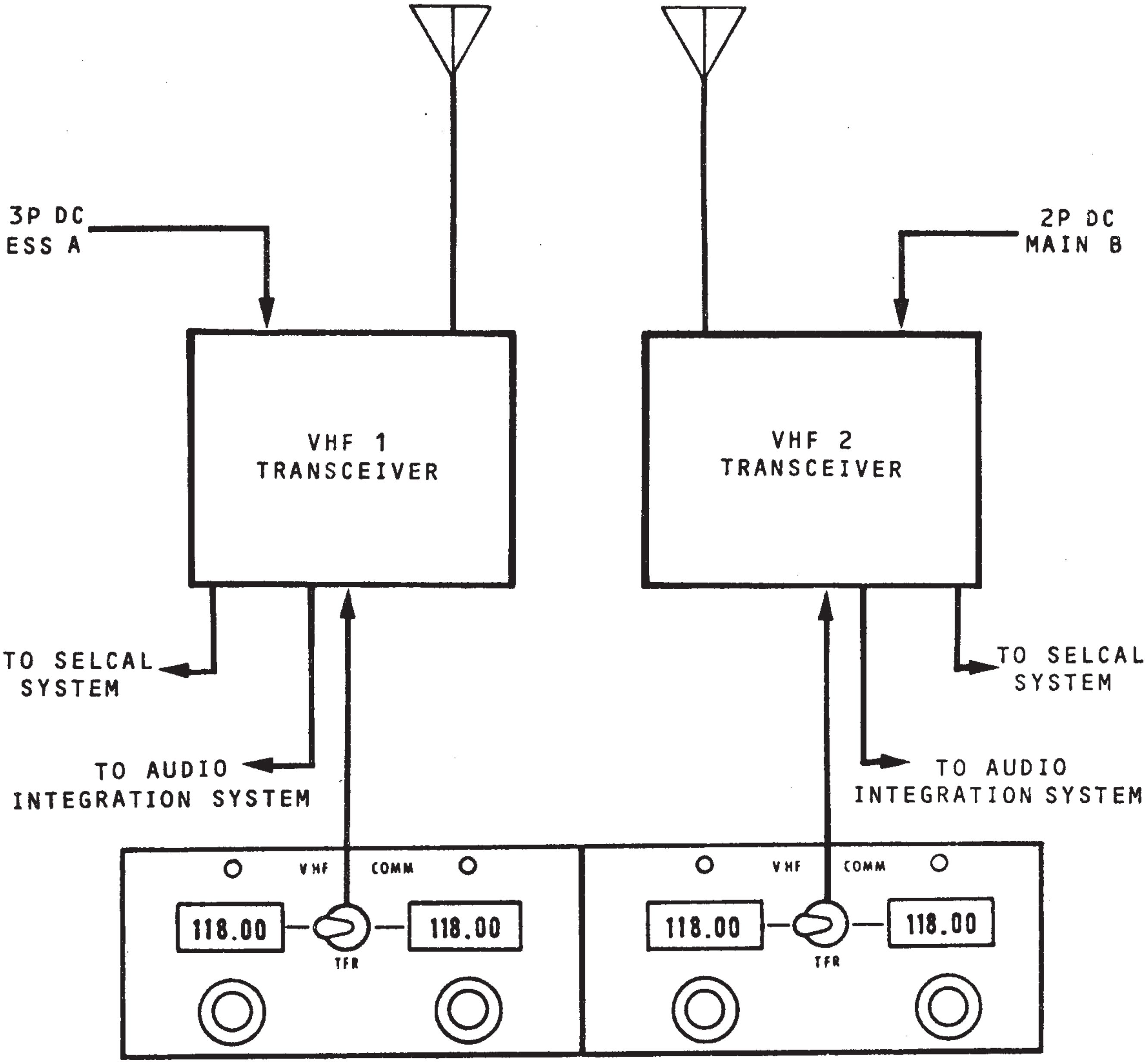
COCKPIT VOICE RECORDER

A cockpit voice recorder records all communications arriving at or originating from the Captain's or First Officer's interphone.

In addition, it records the Captain's, First Officer's and Flight Engineer's conversation via the boom microphones regardless of switching. It also records general flight deck noises through an area microphone.

(Unchanged)

VHF SYSTEM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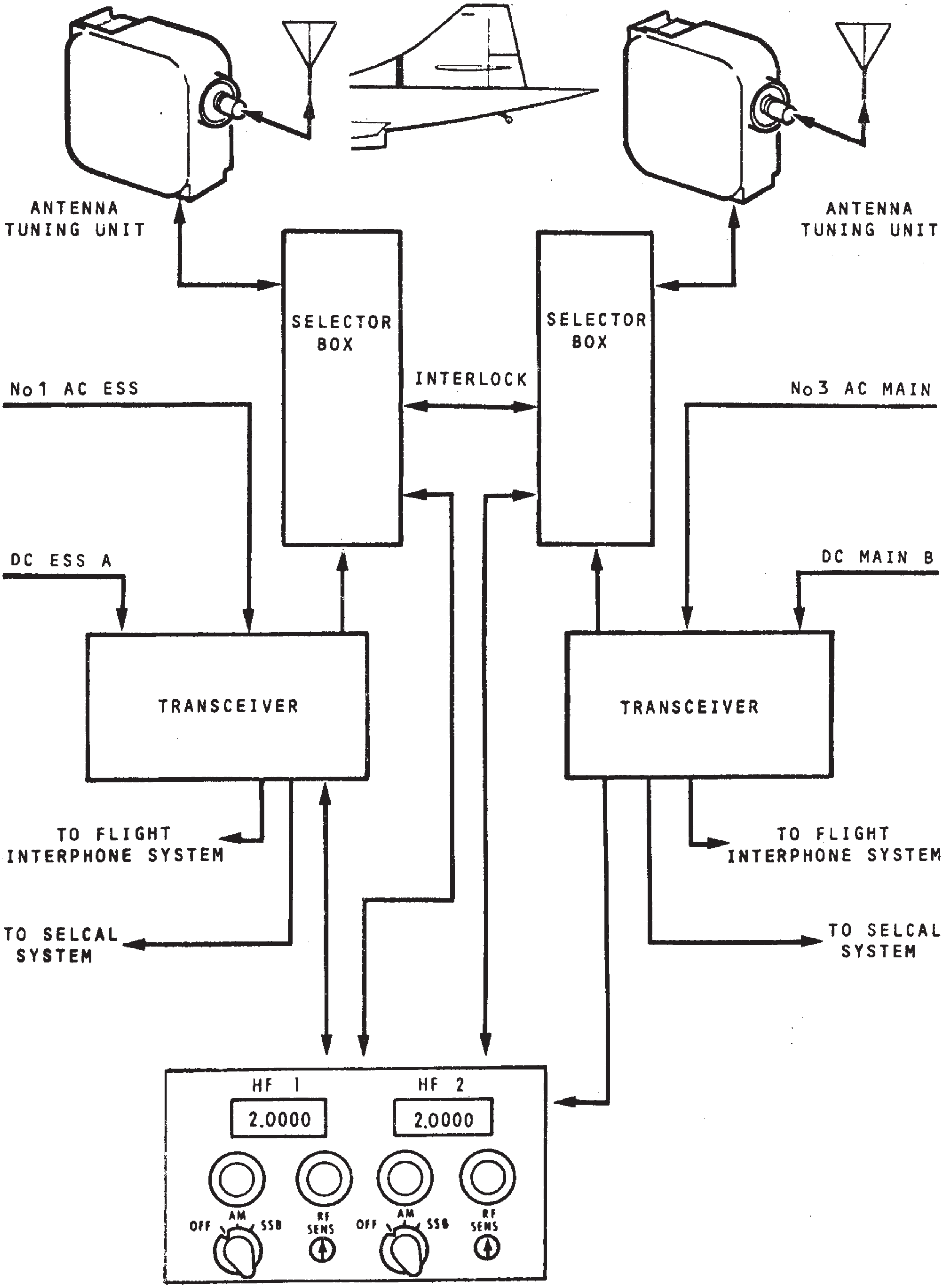
2P DC
MAIN B
VHF 1
TRANSCEIVER
VHF 2
TRANSCEIVER
TO SELCAL SYSTEM
TO AUDIO INTEGRATION SYSTEM
TO SELCAL SYSTEM
TO AUDIO INTEGRATION SYSTEM
VHF COMM
118.00
TFR
118.00
VHF COMM
118.00
TFR
118.00

HF SYSTEM


ANTENNA TUNING UNIT
ANTENNA TUNING UNIT
SELECTOR BOX
SELECTOR BOX
INTERLOCK
No1 AC ESS
No3 AC MAIN
DC ESS A
DC MAIN B
TRANSCEIVER
TRANSCEIVER
TO FLIGHT INTERPHONE SYSTEM
TO FLIGHT INTERPHONE SYSTEM
TO SELCAL SYSTEM
TO SELCAL SYSTEM
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2.0000
OFF
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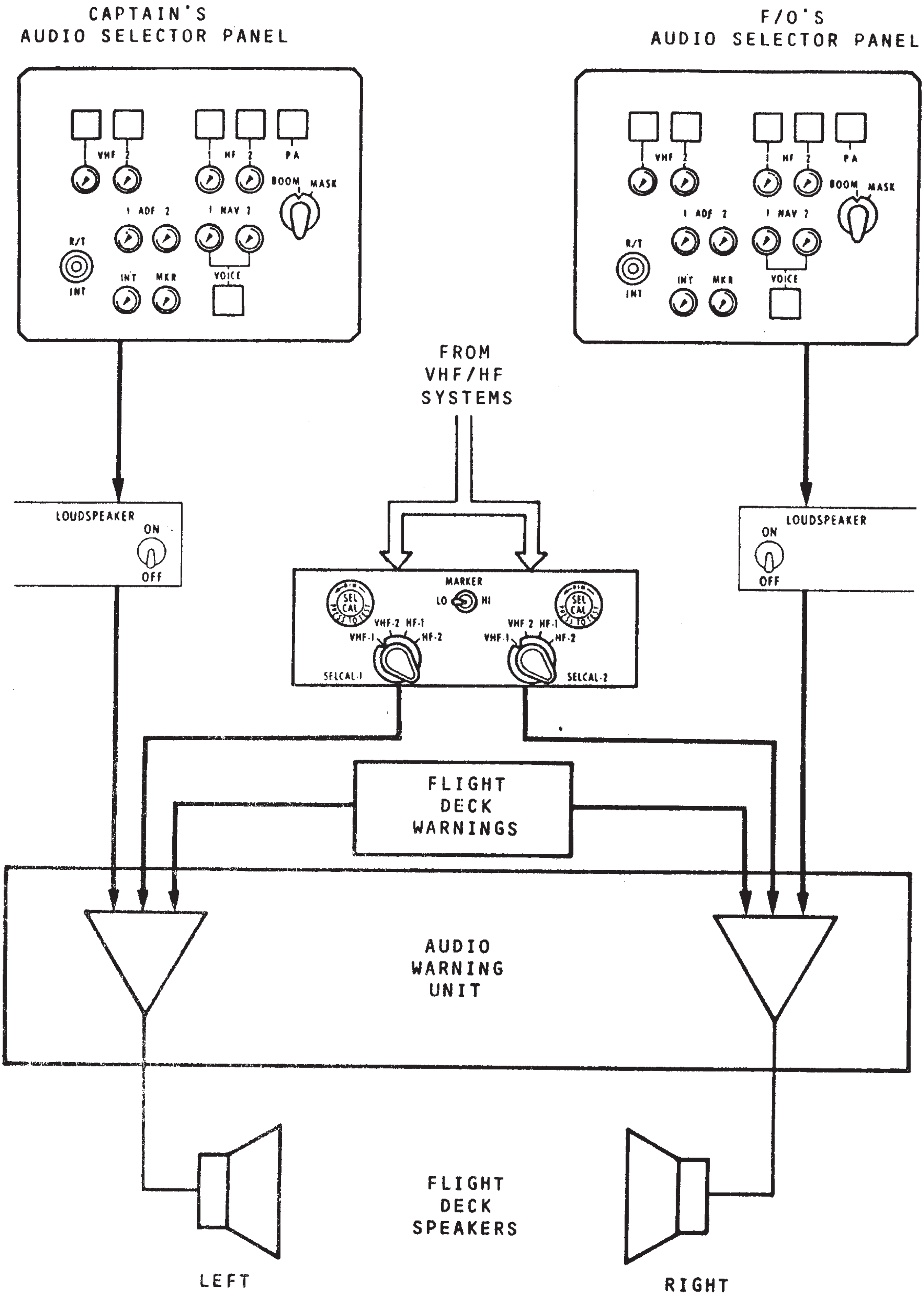
SSB
RF SENS
OFF
AM
SSB
RF SENS

SELCAL AND SPEAKER CONTROL



(Unchanged)